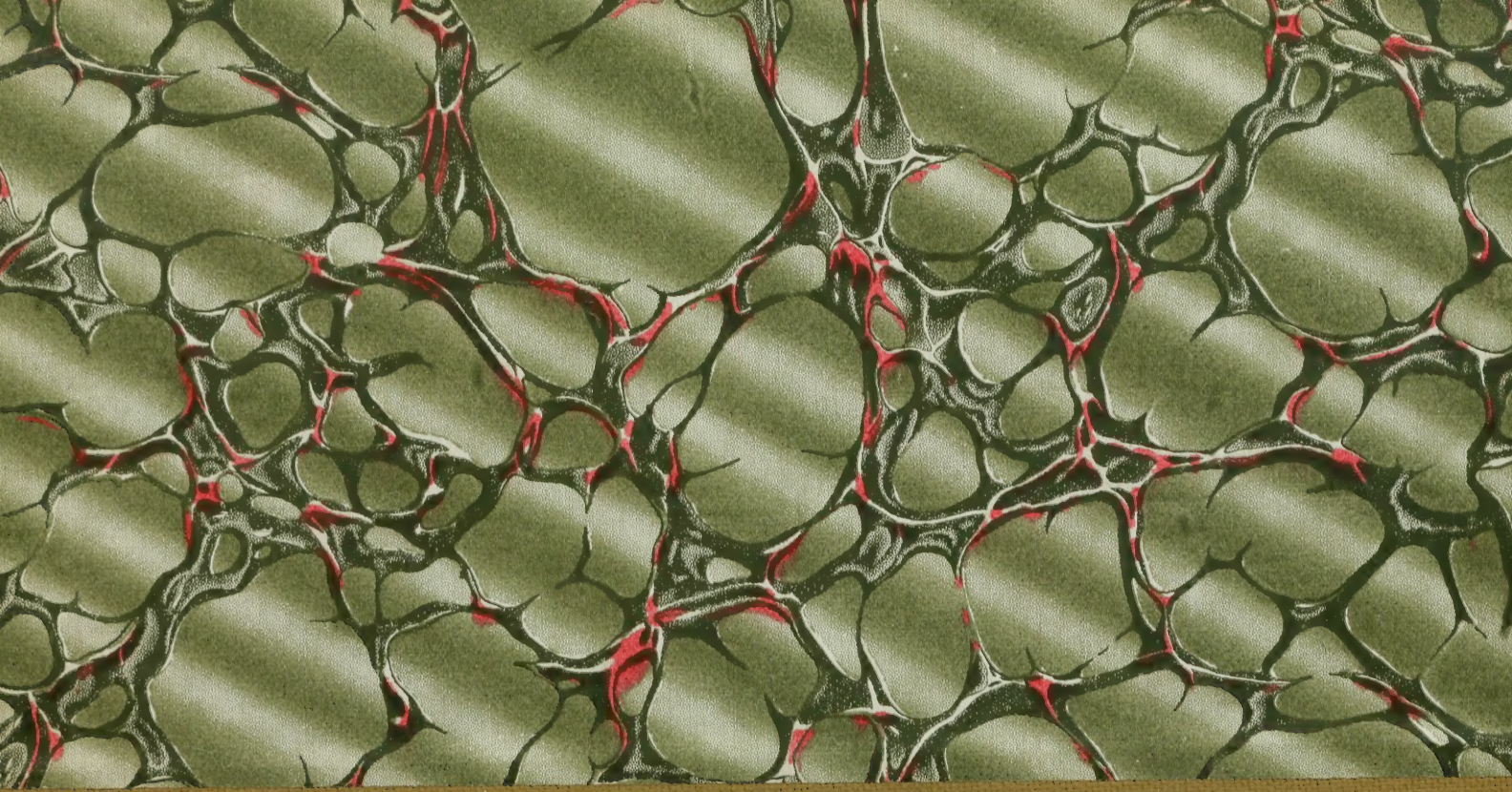

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THE

Missouri Dental Journal.

A MONTHLY RECORD OF MEDICAL SCIENCE,

DEVOTED TO THE SPECIALTY OF DENTISTRY.

EDITOR:

HOMER JUDD, M.D., D.D.S.

ASSISTANT EDITORS:

HENRY S. CHASE, M.D., D.D.S.,

EDGAR PARK, D.D.S.,

Department of Operative and Surgical Dentistry.

W. H. EAMES, D.D.S.,

W. N. MORRISON, D.D.S.,

Department of Mechanical Dentistry.

COMMITTEE OF PUBLICATION:

ISAIAH H. FORBES, D.D.S., G. W. SPALDING, D.D.S.,

H. E. PEEBLES, D.D.S.

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The Missouri Dental Journal.

A MONTHLY RECORD OF THE SCIENCE.

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SALUTATORY.

THE MISSOURI DENTAL JOURNAL, commencing with the present number, will make its appearance hereafter, on the fifteenth of each month. Means sufficient to defray all of the expenses of publication for at least one year, have already been placed at the disposal of the publishers, so that its existence will not be jeopardized for want of funds to carry on the enterprise.

Each number of the Journal will contain about forty pages of reading matter, which will be placed under three different heads; the first, containing the principal articles of scientific and literary import; the second, those relating principally to Operative Dentistry, and the third, to Dental Art and Mechanism and miscellaneous productions.

We hope, by thus placing each department under the special charge of a competent assistant editor, that each branch will receive its due meed of attention. Although we propose to lay before our readers, as far as it is within our power, every improvement in dental practice and all veritable discoveries which more immediately concern us as dentists, in medical science, still, we are not unmindful of the fact, that the great desideratum is, undoubtedly, a more general dissemination of the truths already known, and the best way to accomplish this result is the great question to be solved by those who are engaged, in any way, as educators of the masses of the profession. Much of

this valuable information is to be found in voluminous text-books, and not unfrequently enveloped by so much rubbish in the shape of theoretical doctrines and discussions, that it is not strange that so few are really well informed relative to the established doctrines of the day. It seems as if a journalist might do something in the way of separating the wheat from the chaff, and thus be of some service to those who are desirous of acquiring correct views of the present status of Medical and Dental science. The dental journals that already exist are doing much to forward the educational interests of the profession, and deserve great credit for what they have already done, but the field is broad and the laborers are few.

We enter, however, upon this work with a full appreciation of its importance, as well as of the annoyances and difficulties which one must naturally expect to encounter, but with an earnest desire to do our part honestly, and labor without fear or favor, to bring forth truth from the conflict of opposing doctrines and opinions, without being influenced in our conclusions, or warped in our judgment by any preconceived opinion, but ready to "try all things and hold fast that which is good." We do not expect to be able to satisfy all of our readers, and if one objects to the editorials, and another to the tact and judgment displayed in our selection of articles—if one finds fault with our logical deductions, and another with our composition, we presume that there will be good ground for their criticisms. To those who are dissatisfied with the Journal, we would merely say, send us some of your own contributions, that shall embody all of the perfections that you desire to see in the literary productions of the profession, and we will gladly ornament our pages with the productions of your labor, and our readers will undoubtedly thank us for so doing. Our pages are open for all who have the ability to instruct, and who desire to work for the good of the profession.

This number of the JOURNAL will be sent to a considerable number of practitioners whose names are not on our subscription books, and we hope that they will all be pleased to become

subscribers to it; but should any one not desire to do so, we request him to return this number to our address. We expect no pecuniary remuneration in this enterprise, which will cost us a good deal of labor and time and some money, and we do not feel as if we were asking too much of the profession, to assist us, at least to the extent of a subscription to the JOURNAL. We are in hopes of our being sufficiently fortunate in our efforts to establish a useful monthly publication, to make it to the interest of every practitioner to place it upon his table.

From the Chemical News.

IDENTITY OF PHYSICAL WITH SO-CALLED VITAL FORCES.

By PROF. LETHEBY.

In the course of some remarks addressed to the students of London Hospital, on the Identity of the Physical with the so-called Vital Forces, Dr. Letheby says:

"Lastly, I will remark, in illustration of the general tendency of physiological pursuits, that great efforts are being made to determine the constitution as well as the composition of the fluids and tissues of the living body; for there has long been a desire to understand the way in which the common affinities of matter are controlled by the living cell. Broadly, the chemist has ascertained that the chemical functions of the plant are those of reduction or de-oxidation, whereby carbonic acid and water lose oxygen, the residual elements with the nitrogen of ammonia forming tissues. The functions of an animal, as I have said, are of an opposite nature, for instead of building up they pull down; and in using the tissues of plants as food they oxidise them, and finally restore them to nature, as carbonic acid, water and ammonia. 'The two extremes of these changes are,' to use the words of Gerhardt, 'carbonic acid, water, and ammonia, at one end: albumen, gelatine, fat, and cerebral matter at the other;' but the transitions to these extremes are countless, and are as yet almost beyond the ken of science. Who can tell us by what series of transformations the carbonic acid and water, received by the plant, are converted into vegetable acids, sugar and fat? And still more mysterious are the phenomena which accompany the formation of tissues. Why is it that a living-cell, as we call it, possesses the power of transforming cosmical forces, light and heat, into cell-force; and in aggregating matter, how is it that it

keeps common affinities at bay? That when it dies, as we express it, the matter so aggregated during life, decays, and comes again within the reach of ordinary affinities? What answer can we give to these questions? No other than that organic matter is the designed or appointed medium of these changes: and we can no more explain the phenomena than we can say why it is that mineral matters are the appointed media of other manifestations, as light, heat, magnetism, and electricity. Such questions are beyond the scope of the human intellect, and mark the limit of our understanding.

"Apart from these questions, however, the chemist has hope that he will penetrate the mystery of organic changes, in so far as the chemical combinations are concerned. Already he has found the clue to many of the vegetable processes of reduction, and has been able to produce a large number of organic compounds from carbonic acid, water, and ammonia, and even from the elements themselves: in fact, of the three great classes of alimentary substances, as Dr. Odling says, the production of the oleaginous is quite within his reach: the saccharine is almost within it; but the albuminous is still far beyond it. He has thus proved that the dogma of a vital force, which has tyranized so long over men's minds, has no foundation: for a host of organic compounds can be made artificially.

"And then with regard to the processes of oxidation which characterize the functions of animals, he has been able to imitate them to a much larger extent: for, by subjecting organic compounds to chemical transformations, he has produced a multitude of secondary products like those of the living world; recognizing the fact that all secondary products of tissue-transformation are compounds of comparatively simple molecules, from which the elements of water have been eliminated—in other words, that they are composed of the residues of other molecules, the chemist has been able, not only to classify them into certain definite groups, but he has also been able to construct them after the fashion of organic nature. *Stearin* has been produced by joining the residues of glycerine and a fatty acid. *Sarcosine*, which is a muscle-product, from putting together the residues of acetic acid and methylamine. *Hippuric acid*, from the residues of benzoic acid and glycosine. *Taurine*, which is a constituent of bile, from the residues of isethionic acid and ammonia. *Urea*, from the residues of carbonic acid, and ammonia, and so of many others.

"In this way 'organic chemistry has achieved,' as Dr. Odling truly observes, 'a great *analytical* success. The compounds so

elaborately built up by the living organism, it has pulled to pieces, and the pieces themselves it has arranged into natural series and groups of associated bodies.' It has also effected *synthetical* processes, and has built up organic compounds from mineral elements; and its hopes are that the entire processes of organic nature, short of making tissue, will ere long be seen and imitated. Presumptuous man! it may be thought, are you not striving for the impossible? In these explorations of vital phenomena, are you not trespassing upon holy ground? Can the finite measure the depths of the infinite? Already we have done so. 'The being of a day has pierced backwards into primæval time, deciphering its subterranean monuments, and inditing its chronicle of countless ages. In the rugged court and shattered pavement of our globe, he has detected those gigantic forces by which our seas and continents have changed places; by which our mountain ranges have emerged from the bed of the ocean; by which the gold and silver, the coal and the iron, and the lime, have been thrown into the hands of man as materials of civilization, and by which mighty cycles of animal and vegetable life have been embalmed and intombed.' He has ascended the Empyrean, and by steps of physical research, has reached the visible boundaries of the universe, and has scanned with eagle-eye the mighty creations in the bosom of space. He has marched intellectually over the mosaics of the sidereal systems, and has followed the adventurous Phæton in a chariot which can not be overturned.' 'Ideas like these, when first presented to a mind thirsting for knowledge, are apt,' says Sir David Brewster, from whom I am quoting, 'to disturb its equilibrium and unsettle its convictions. Should this be the mental condition of any one of you, be not alarmed for its results, for this species of scepticism is the infant condition of the uncurbed and generous intellect. There can be no convictions where there have been no perplexities and doubts: and that faith which comes in the train of early scepticism will finally rest upon an immovable foundation."

DEFORMITY OF THE SUPERIOR MAXILLARY BONES.

Mr. R., a gentleman of about forty-five years of age, called upon me some six months since for the purpose of consulting about a deformity of the upper jaw. Upon examination, I found the upper jaw projecting forward to such an extent that

when the mouth was closed the upper incisor teeth were at least one inch in front of the lower incisors. The first molars above had been extracted some years before, and the principal part of the abnormity was confined to that part of the jaw anterior to the molar teeth. The bicuspids, canines and incisors, as well as the 2d and 3d molar on each side were good, and the canines and incisors very large and of good, hard structure. The projection, however, seemed to be due rather to the abnormal position and size of the alveolar process than to any enlargement of the body of the maxillary bones.

The projection was not produced by an anterior inclination of the free margins of the alveolar process and a consequent change in the direction of the long axis of the teeth from a position nearly vertical to one much inclined forward as is sometimes seen, but the whole process projected forward at the line of junction between the process and the body of the bones, so that the cutting edges of the teeth preserved the normal direction. The concavity of the palatine arch was deep, and although the lips were well developed, it was with great difficulty that the upper lip could be brought down so as to cover the upper teeth.

The lower maxillary bones seemed to be well developed in the rami, and, for a short distance in front of the junction of the rami with the body of the bone, but the anterior two-thirds of the body of the bone seemed to be somewhat smaller than usual, whilst the alveolar process, and consequently, the teeth, so far from projecting forward to correspond with the upper jaw, was a little inclined backwards. The only teeth that could be brought together were the sapientiæ, and these but very imperfectly, so that mastication could scarcely be performed at all. Many words could be but imperfectly articulated, and with much difficulty, and the gentleman had become so sensitive about the deformity that he was ready to submit to almost anything that would promise relief.

After fully explaining to the patient the method I proposed to pursue, he determined upon having the operation which I recommended performed, and having called in Dr. Jno. T. Hodgen to assist me, I gave the patient gas and extracted the ten teeth in

the upper jaw without difficulty. After the blood had ceased to flow, I gave the patient a mixture of ether and chloroform, and the gum first being dissected from the alveolar process, the whole process was removed by Dr. Hodgen by means of strong, bone-cutting forceps, from the 2d molar on one side to the corresponding tooth upon the other side. The hemorrhage was but slight, and the flaps were then laid down over the margin of the bone, and the patient directed to call in a few days.

After a few days, the patient presented himself, and adhesion had taken place on nearly the whole surface by first intention. There were a few ridges where the flaps had lapped over one another, and throwing the Rhigoline spray upon them, I trimmed them off smooth with a pair of laterally curved scissors. In a few weeks, the parts were perfectly well, and I took an impression in the usual way with plaster, and put up a plate of teeth which was easily articulated with the lower teeth, and which remedied the deformity and supplied the conditions for mastication and speaking as perfectly as it is usual to do where there is simply a loss of the upper teeth. It may be proper to add that the deformity was congenital and hereditary, several of the family being afflicted in a similar manner, though to a somewhat less degree. J.

THE ASSOCIATION.

The last meeting of the American Dental Association at Niagara brought together the usual number of delegates from all parts of the country, except the extreme South, but we are inclined to think that most of those who remained through its session of four days felt that it was wanting in some of the requisites which would enable us to speak of it as a decided success. It was very generally conceded that by far too much time was spent in business matters that few felt much interest in, and it was occasionally hinted by some irreverent members that the Association was being used to further the private interests of certain members who were more desirous of creating a notoriety for themselves than anxious about the progress of dental science. Be that as it

may, the fact cannot be controverted that the first two days were spent without reaching a single Report of the Standing Committees, and at the end of the third day only one report had been read, and partially discussed. The discussions, however, upon the first report, which was upon Pathology, were eminently practical, as the treatment of the pathological conditions were brought into the discussion, forming together a subject of much interest to those who attended the Association for the purpose of adding to their stock of useful knowledge. I do not desire to be understood as hinting that any one went to the Niagara meeting for any other less reputable purpose, but all sorts of surmises were current to account for the inability manifested in getting to work upon scientific subjects.

Much time was spent in discussing the propriety of admitting delegates from the American Convention, which, it was claimed, was like the Association itself, a national Society, and not a local Society in the sense which would entitle it to a representation in the American Association. The delegates were finally admitted, but the amendment to the Constitution proposed by Dr. Watt, at Cincinnati, was almost unanimously adopted. As this amendment, which declares that no Society shall be entitled to representation which shall not substantially have adopted the code of ethics of the American Dental Association, will exclude further representation from the American Convention, its adoption shows that the world moves,—as the same amendment was vigorously opposed, and rejected by a considerable majority, at Cincinnati.

A good deal of time was likewise taken up in debating a proposition to admit delegates from Canadian Societies; and although they were anxious to extend to their Canadian brethren any and every privilege which the Constitution would allow, they had learned so well how not to do it, that nearly half a day was spent before a vote could be taken that would definitely express the wishes of the Association.

A more stringent set of regulations, relating to the order of business, was adopted likewise, one of the provisions of which requires all papers to be read, and discussions upon scientific subjects to be gone through with, before the election of Officers

takes place. This seemed to be necessary, inasmuch as the interest of several valuable members seemed to flag after the elections were gone through with, and it was desirable that all should be done by the Association that could be done with propriety, to keep up the interest of the meetings.

Although few were entirely satisfied with the late meeting, nearly all who remained to the end of the session felt assured that the wise measures adopted to prevent a repetition of the dilatory scenes another year, would ensure a meeting at Saratoga that would come nearer to the ideal of the most enthusiastic, and consequently prove a greater success. It is to be hoped, however, that a few of the members will in future have a little more regard for the common courtesies of life, if they ever venture again upon the experiment of attending another meeting of professional men. It may be proper to remark here that when the chairman of a meeting calls to order, or when the gavel is brought down, it is usual for men of good breeding and good sense, if they chance to be standing, to take their seats and give attention to the business of the meeting; but it is common for some to go on with their mumbling conversation, or, if they happen to be on the floor at the time, to stop, perhaps, and direct a vacant stare at the chairman, as if they were at a loss to determine what the raps meant, and then proceed in their perambulations around the hall. In no situation, and under no other circumstances can a man sooner write himself down a clown in the minds of all correct observers, than by inattention to those requisites which attach themselves to members of all societies or associations, but more particularly to members of associations composed of grave professional men. The members of the American Association are for the most part intelligent and decorous, and it is a great pity that their deliberations should be disturbed by a few whose early training seems to have been sadly neglected. These annoyances are to be found to a greater or less extent in all public assemblies, but it is to be hoped that they will hereafter grow less in the meetings of the American Dental Association. As motion, or a tendency to motion, seems to be an inherent property of matter, so lawlessness seems to be inherent in the

constitution of certain persons, and it is somewhat doubtful whether the individuals themselves are altogether accountable for it, or not. For instance, it seems to be impossible for some to listen to others speaking in an assembly and uttering sentiments with which they do not agree, without interrupting the speaker, although they know that an interruption under such circumstances is a gross breach of decorum as well as of parliamentary law; and others, when debating questions, have an uncontrollable propensity to attack men rather than opinions or doctrines, and as a consequence, the discussions soon degenerate into acrimonious personalities, crimination and recrimination too often taking the place of legitimate argumentation. These principles were but too well illustrated at the last meeting of the Association at Niagara, and as such illustrations are illy calculated to interest scientific men, we would simply suggest to persons of strongly marked pugilistic propensities, that a meeting of the American Association is not the proper place to manifest their accomplishments in this direction.

Although we are not altogether blind to some of the shortcomings of the Association, we should be derelict in our duty if we did not bear witness to the ability and high professional standing of the great body of members present. Intelligence, energy and perseverance, as well as an earnest desire for professional advancement and scientific progress, may safely be set down as characteristics of a great majority of the members of the late meeting at Niagara. J.

CLOSING REMARKS OF PROF. H. E. PEEBLES' ADDRESS.

Delivered before the graduating class of the Missouri Dental College, at its Second Commencement, Feb'ry 26, 1868.

Gentlemen of the Board of Trustees—You now hold in trust the mere *germ* of the Missouri Dental College, that looms up in the distance, to our gaze. Cast your eyes into the future, and behold your school, in all her imposing grandeur; not as the mere western outpost of the little sisterhood of dental schools, fighting her way into existence and notice, but as the great central college of dental learning.

Students from the East, and students from the West—students from the North and from the South, will come flocking to your school. Your platform is broad and your curriculum is large; but the former may need another plank, and the latter another section or two. You marked out a new course, and now you must elaborate and amplify it.

Other colleges will be established upon your excellent model. The Gulf States must have a school; the Pacific States must have schools; the Lake States will not long stay behind. But these, all, in the very nature of things, must draw their support from mere local supplies, owing to their marginal positions; while we are occupying the grand geographical centre of the vast field of supply, and hold the vantage ground, and must and will draw our supplies from every quarter, and from each point of the compass.

All you have to do, gentlemen, is to amplify your plan, fill your chairs with the best talent and encourage a respectable journal, replete with science and art.

If this vision, seen by your speaker, is not clear and distinct to your own eyes, just permit him to point out to your mind's eye a few prominent facts, a few salient points in the picture that now lies spread out before us. First, behold this great American valley, stretching from the Alleghanies on the east, to

the Rocky mountains on the west; from the table lands and great chain of lakes, in the north, to the Gulf of Mexico, in the south. In vastness of extent, and diversity of climate, in fertility of soil, and variety of productions, it has no equal on the face of the earth. This great valley is capable of producing grain enough to bread the world. It is capable of sustaining a population as dense as that of the British Isles. Its mineral wealth is so great, that the extent thereof has never yet been measured, calculated, or even approximately guessed at.

But this view does not show you the entire picture. This is only the centre-piece—this is only the common-school district, from whence we are to get the day scholars, so to speak. But ours is a boarding-school; and our supply is to be much enlarged by pupils from far distant points.

Why, even *now*, in this early period of our history, we have a student from one of the chief capitals of continental Europe, who comes here to take a thorough course, and fully qualify himself as an American dentist, and then return to his fatherland and display his diploma to the admiring gaze of the citizens of confederate Germany. And may he be honored as dentist to His Majesty. And O, that he may extract the fangs of the dreaded *Bismark*, and quiet the fears of the "nephew of his uncle."

Why, even now, in our mere germinal stage, look up, look off, raise your eyes, and see afar off; cast about, and behold your surroundings, and *note* your central position.

But come with us once more and we will trace out the prominent lines on the map. And just here, let us remind you that one of the peculiar traits of American enterprise has established a custom among us of selecting the place where two public roads or high-ways cross each other, as the most eligible site for the church, the store, the school-house and the blacksmith shop, and in strict conformity to this time-honored national custom, we have selected this point as the place for *our school-house*. Here, too, the church, the store, and the smith shop, are also building at this grand central cross, where the *road* crosses the river. The river, did we say; yes, *the river*, that rises upon the

great plateau that divides the waters of the Arctic slope, from that of the tropics, and flows down through this rich valley to the Gulf of Mexico.

She gathers the rich products of the east and the west, of the north and of the south, and bears the wealth of the forests, the fields and the mines, the lakes and the seas upon her generous bosom, to fill our stores, and enrich our community. Behold this mighty river, this great highway of freight and of travel!

See the beautiful and majestic Mississippi. Calmly resting her head in the cooling shades of the dark and dense pine groves of the distant north; note her tresses, all spangled and sparkling, with gems of virgin copper and silver of the out-cropping plutonic rocks, of Lake Superior; look admiringly at her attractive curls and beautiful ringlets; examine her fashionable waterfall at St. Anthony's, and steal an admiring glance at her heaving bosom on Lake Pepin. She stretches out one arm to the east, and toys with the carboniferous wealth of the Alleghanies, and gathers in her hand the petroleum of the valleys. The other arm she extends westward, and caressingly embraces the mighty snow-crowned peaks of the Rocky Mountains. These she induces to yield their golden treasures and rich furs, to swell the gorgeousness of the robe that covers her. But time would fail us to point out the vastness of her resources, describe her power, or name a tithe of her generous deeds. But come, and let us contemplate her, as she lies, resting her head upon that adamantine pillow, reclining upon her bed, all down through this immense vale, and see her lave her feet in the thermal waters of the greatest gulf in all the earth. Into this mighty cauldron of the vasty deep, she pours her living stream, rich in the vegetable gatherings from all the vast extent of the American valley, there to mix and commingle with the salts of old Ocean, and to be stirred and turned and tumbled, by the power of the trade-winds, heated up by a tropical sun, and poured out through the mighty Gulf-Stream, and hurled away across the Atlantic Ocean upon the north-western coast of Europe, to mollify the climate and fertilize the shore.

This majestic river, we say, is one of the great highways of

the earth. Crossing this great river at right angles, runs the Atlantico-Pacific Railway, uniting with its extensions by ocean steamers, Europe and Asia *via* St. Louis.

The magnificent iron bridge, with its three grand arches, will soon span the Mississippi, and the last rail will be laid, and the last spike will be driven, in the iron chain that is to bind the East and the West together.

Then, ah! then, will come the great iron-horse, thundering o'er the plains, breathing out fire and smoke, careering onward, from east to west, and from west to east, making old Earth tremble under the ponderous wheels of his richly freighted and heavily laden car.

This great road-way of nations will bring the manufactures of the East and the products of the West to enlarge our store, and make us rich. Here, too, is the place for our blacksmith shop, right here, beside the biggest pile of iron in all the world.

Ah, yes; then, too, our lovely Pilot Knob will be seen and admired for her stateliness, and our Iron Mountain for her riches, by the wise men of the East and the avaricious men of the West, and they will be ravished of their virgin treasures, to be borne away in exchange for merchandise of the Orient, or for peltries of the Occident. While in our store we are accumulating the rich silks of Japan, the costly shawls of Cashmere, the fragrant teas of China, the pure and luscious wines of California, with the golden nuggets of Montana, and the silver bricks of Colorado,—thus, while in our smith shop, we will forge the chains that are to bind the nations of the earth in one great community of common interest and fraternity. In our church the gospel of everlasting peace will be preached to the assembled representatives of the nations of the earth.

You, gentlemen, will still continue to build up your schoolhouse, here, at the *cross-roads*, and train the sons of men for usefulness and honor in our NOBLE PROFESSION.

Operative and Surgical Dentistry.

SALUTATORY.

As the Editor of this Department, I have but little to say as an introduction.

I hope, by the aid of good "contributors" to present something each month worth reading; and to this end I cordially invite short papers on Surgical and Operative Dentistry.

Contributors will please write only on one side of the paper.

I should be glad to receive statistics in regard to pulp treatment by destroying and removing it, and by saving it alive by the oxy-chlo-zinc method, or any other method. To do this one must record every case fully, and therefore an account should be opened and many spaces ruled, so as to give a full history of the operation. C.

OXY-CHLORIDE OF ZINC.

However useful this substance may be in the treatment of living pulps, it certainly is not a reliable filling as a *test*. Teeth having exposed pulps have been plugged with the zinc, and remained perfectly quiet for months; but on removing the plugs for the purpose of inserting gold ones, the pulps have been found dead and gone. They had decomposed, and the consequent gases had found their exit through the innumerable pores of the oxy-chloride of zinc. Now if a *test plug* is desirable after treating a living pulp, it evidently should be one which shall have the same impervious character as the gold one which is to follow. I therefore use *over* the zinc, Hill-stopping. C.

CYLINDER FILLING.

This method of using gold is altogether too much ignored at the present day. There are thousands of dentists who never use a cylinder. There are some very important advantages in their use.

But what is a cylinder? A "rope" cut into short lengths does not make cylinders. Cylinders are made by folding, carefully, a whole or part of a sheet of foil, so as to make a long and narrow strip or ribbon. The width of the latter should be that of the length of the desired cylinder. This is to be wound around a broad or small four-sided drill, until the roll of gold is large enough. A small, clean piece of paper should be used between the thumb and finger, in which the ribbon should be placed, that it may not be soiled by the exhalations from the skin. The latter is a point too much neglected by those manipulating gold. Mr. Spackler, instrument maker, of this city, has made me a very nice instrument for making cylinders. It is a pair of delicate tweezers, the two arms of which, near the points, are not larger, combined, than No. 25 wire. The arms are adapted to each other for a quarter of an inch from their points, so that when they are brought together they hold firmly the "ribbon" which is to be wound around them. When the tweezers are closed, these arms, in contact, look like a single shaft. A spring, easily opened, holds the arms tightly together, when closed.

Large cavities, with favorable walls, may be very rapidly filled with cylinders. They are placed on end at the bottom of the cavity, and project above its superior margin, as much as desirable, then with a "foot" instrument condense against the sides of the cavity. Proceed in this manner until the cavity is nearly full, using smaller cylinders as the space grows less. It is not convenient to use a cylinder to fill the last small space. It is better now to use pellets, and a plugger to force the gold to the bottom of the cavity. This can more surely be done than with a cylinder. Care must be taken, as the cavity grows smaller, to keep the bottom of the cavity filled solidly, and if the cavity is very deep it may be necessary, after using long and large cylinders, to lessen the depth of the remaining cavity by inserting a solid floor of pellets.

When full, the gold projecting above the cavity should be condensed with shallow-serrated, or smooth pluggers. These cylinders, projecting above the superior margin of the cavity, make a beautiful and perfect margin, and there is less danger of *nicking*

out the margin than in the use of pellets. If the cavity is undercut much, *short* cylinders or pellets must be used until the gold is brought out to the perpendicular line falling from the enamel margin, otherwise a cavity just under the enamel will remain unplugged, presenting a weak point for pressure in mastication, and very likely a source of decay.

In wet mouths, or when time is to be economized, this method of filling is very advantageous, as it very much shortens the operation. There is no method in use in which a greater weight of gold can be compressed into a cavity than by the use of cylinders. C.

REMOVING AMALGAM PLUGS.

Nearly every Dental Journal in this country, has had an article on this subject, within three months, recommending quicksilver to be applied to the plug, for the purpose of softening it. They have said that it would soften the plug in a *few minutes*, so that it could readily be removed.

Now, I have tried quicksilver in this way, and so have many of my friends, and none of us have realized any such result. I put an amalgam plug, a month old, into a vessel of quicksilver, and let it remain twenty-four hours. Even then the plug was not sensibly softer than when first put in its bath. One person makes a plausible statement, and hundreds repeat it as true, without ever making an experiment to prove it.

We need more experiments in every department of medicine. *Facts* are first wanted, and then theory is very good as an explanation of them. C.

METHOD OF FILLING APPROXIMAL CAVITIES.

This is, indeed, a very important operation, and possesses many valuable points that must not be overlooked, or the object to be attained will be a signal failure—the preservation of the teeth. The first thing that should claim our attention, after exploring the parts to be operated upon, is the most effectual way to reach and remove the disintegrated portion of the tooth, which

should be accomplished without any material detriment to the appearance or usefulness of the organ.

The preservation of the original form of the teeth is a desideratum to the possessor of them, and is a point not to be recklessly ignored by the operator to subserve his convenience—for with the latter it is but a few hours labor, whilst to the former it becomes a lifetime annoyance, and a great loss; now, in order to attain excellence in these operations, I cannot think that, as a rule, it is necessary to file away one third of the most useful portion of the tooth, to make room for performing the operation of filling; while, on the other hand, when any portion of the masticating surface is removed, either by caries or otherwise, it should be as nearly restored as possible with gold in filling the same. I am clearly of the opinion that these teeth can be elegantly filled with no detriment of any consequence to the triturating surface.

The following is the method that I pursue in opening the cavity and removing the decay in the approximal surface of the molar and bicuspid, without the use of the file—that much and justly dreaded instrument: Take a small, flat drill, and place the point in the depression between the cusps of the tooth to be operated upon, and drill through, just above the floor of the approximal cavity, and continue to enlarge the opening with bur drills, until we have attained near the size of the width of the cavity in the approximal surface next to the septum; then remove the redundant portion of the tooth with paring chisels, preserving the outer and inner surfaces of the tooth intact; then remove all of the decomposed dentine, pare the edges of the cavity—thereby removing any softened enamel that may exist, and giving a roundness to the margin—syringe the cavity well, and, when all the extraneous substances are removed, make retaining points diverging in the floor of the cavity, being careful not to encroach upon the nerve; I prefer that the walls of the cavity should be perpendicular. I then decide upon the kind of dam I will use, whether rubber, string or cotton; I prefer the rubber, either in tube, or the coffer dam, when it can be adjusted. I prepare the gold foil by cutting the leaves of No. 4 soft gold foil in half, and roll each half separately in the form of loose rope and clip it into

four, six, eight or ten parts as the size of the cavity to be filled would indicate: the gold is then annealed on a marble slab about six inches in diameter, and one half inch thick, using a strong alcohol flame under the slab; I use the marble slab because I think that gold annealed on it is more ductile, and the heat is longer retained than on a metallic plate, and as soon as the gold will adhere when brought in contact, the flame under the slab is lessened, and after thoroughly syringing the cavity the mouth is rendered as dry as it can well be, the dam is adjusted, and a bit of spunk is pressed over the mouths of the parotid gland; the cavity to be filled is rendered perfectly dry, and kept so until the filling is inserted and consolidated; the saliva pump is used to remove the secretions as they increase. Solidity is a point that must be well guarded as the operation of filling progresses. The patient is directed to breathe through the nose during the operation of filling, which I begin by taking one part of this gold at a time, on the point of a small serrated mallet plugger, and carry it to the retaining point, and condense one end of this cylinder of gold in the retaining point, and convey the other end to the wall of the opposing tooth, and likewise to the next retaining point and over the margin of the cavity as before; then extend a cylinder of gold from one retaining point to the other, and next fill the remainder of the floor of the cavity, extending the gold over the margin as in the beginning, and take a smooth crotchet-shaped plugger and condense the extruding end of the gold (this instrument has the effect of forcing the gold well up to the margin of the cavity), and in this way cylinder after cylinder is introduced, each extending end is forced laterally and over the margin, and each side of the filling is left a little in advance of the centre, while being filled; the centre is also filled with some lateral force, being careful that neither side suffers from the effect of this lateral pressure by drawing the gold from one side when the force is applied to the other; this can be obviated by using a foot-shaped plugger, keeping the toe of it towards the floor of the cavity; the last cylinder of gold is inserted in the centre of the plug, on the top, and it is then thoroughly condensed with a small oval condenser.

Now, as a rule, I open the approximal cavity of the incisors and cuspidatis from the labial surface, using a bur drill, from a half to a line in diameter, according to the extent of the decay. The exception is when the whole of the approximal surface is involved, as the palatine wall is the weaker. Observe the same method, as to the protection of the margin, already described. Begin to fill in the retaining point next to the cervical wall, and build along on the palatine wall of the cavity, including the cutting surface, and finish in the labii proximal, and *vice versa*, when the filling is inserted from the posterior portion of the tooth; then condense, file, burnish, and polish thoroughly.

I find that I have omitted to mention that I use the wedge in most cases, but not with much force; and when there is a posterior approximal filling to be made, and no adjacent tooth, I use a strip of gold plate fitted around the tooth and soldered together; this I adjust after the dam is arranged. The anterior filling can be well made without the band.

I have been trying to fill teeth for sixteen years, and have operated in all conceivable ways, and I verily believe that better results can be obtained by closely following the method described above, than by any other. Three years of practice with this method is sufficient to satisfy me that my patients are better served than by any other mode. S. Hinson.

Clay Building, 233 *Main St.*,
Memphis, Tenn.

MORPHIA IN ANÆSTHESIA.

Prof. Green, of the Maine Medical School, recommends morphia as an antidote to nausea during and after the anæsthetic state, and also to the other unpleasant after effects of an anæsthetic. It is to be given at the commencement of anæsthesia.

C.

SAVING THE PULP ALIVE.

There is no subject connected with Surgical Dentistry, which engages the mind of the profession at this time, so much as the above. Experiments in this direction are being tried by thou-

sands, and by the end of another dental year—the next meeting of the "American Dental Association"—we will probably have some reliable statistics in regard to it. In the meantime, I do not deem it advisable for practitioners to give up the practice of destroying and removing the pulp as heretofore practiced. But whenever favorable opportunities occur for watching the case, it would be well to try the experiment of saving even suppurating pulps.

Freshly exposed pulps no one thinks of destroying. In these cases, I wipe the cavity with kreosote and cap with Hill's stopping, and plug with gold immediately. I press the "Hill's" directly against the pulp foramen and do not attempt an arch.

In the next number of the JOURNAL I shall have more to say on this subject. C.

ST. LOUIS DENTAL SOCIETY.

DISCUSSION ON CLEANING TEETH.

Reported by DR. BOWMAN.

Dr. Forbes said, if, by cleaning teeth, was meant when coated with tartar, and gums inflamed as a result of that accretion, it was manifestly the duty of the dentist to remove it, and restore the inflamed parts to health. But when teeth were simply *dirty*, a patient *might* with equal propriety, ask him to *black his boots*. It was not his duty to clean such teeth, but to instruct the *patient how* to clean them, and the material to use, etc., and desire this should be thoroughly done before further operations.

Dr. Judd regarded considerable skill necessary to the successful treatment of the different diseased conditions of mouths presented. They were not always understood. He desired to call particular attention to the rarest species of tartar, so-called —a peculiar green discoloration near the margin of the gum. It differed from the more common varieties of tartar deposits, in that it resulted in the destruction of tooth substance, while the others rather preserved it from caries, although, through its destructive influence on the gums and alveolus, the teeth were often

prematurely lost. Authors were silent on the pathological condition of this green variety. He found, at this portion of the tooth, the cementum slightly overlapping, and thought this green deposit located in the cementum, and imparted by it to the enamel beneath—the latter being more easily affected, from the fact that covered enamel is softer than that exposed—believed it is better to remove it, though with great care.

Dr. Jones removes tartar whenever he finds it, as his bounden duty, much against the wishes of his patients, sometimes, and instructs them how to take care of their teeth, removes the green deposit spoken of with scraper, and polishes it well down to a smooth surface.

Dr. Eames has studied this matter, and considers it important. The duty of the dentist is neglected, if he fails to remove all accretions and polish the teeth. Tartar irritates the gums and the whole mouth generally. He believes the green deposit is due to neglect in early life; cuts it away and polishes with great care, using stone and the different grits used for this purpose.

Dr. Comstock removes as much tartar as possible the first sitting, and discharges his patient with instructions how to restore the parts to health, before completing his operations.

Dr. Chase tried to stimulate young patients to give attention to their teeth by appeals to their pride, usually put them in proper condition, by way of example, and if they returned with unreasonable deposits of dirt and tartar, forgave himself for refusing to teach them their duty again. Had thought the green deposit a chemical erosion, a result of acidity of the stomach, and not a pathological condition. He first saw it in the overlapping cementum, removes it thoroughly, and polishes the part affected.

Dr. Morrison inclines to Dr. Chase's theory of the cause of green deposits, cleans and polishes teeth in all mouths presented for thorough restoration to health, and always feels compensated, no matter whether he receives a fee or not. Pecuniarily, he does not count this work.

Dr. Bowman believes, as *godliness* is to the salvation of the soul, so is *cleanliness* to the preservation of the body, and where, if not in our mouths?

Evidently, it is some one's duty to keep this cavity clean and healthful, and if through a lack of perception of *how* to best secure this end, on the part of the patient, the teeth become coated with large deposits of tartar, the gums inflamed, and the entire oral cavity diseased and filthy, there is a duty incumbent on the dentist to instruct and relieve the patient. This may be thought sufficient by some dentists, that they conjure their patients to "keep their teeth clean."

But a few years will tell the sad story so often and so sadly repeated. "I used to take good care of my teeth, but I have taken so much medicine, my teeth all dropped out one after another." Who has not heard this story until it has become stale, while the real cause is neglect and *filth*, in allowing tartar to accumulate and remain on their teeth. Most people regard their teeth clean when those in front look comparatively white. This is not the case, however, and only those who have been shown time and again *how* to keep their teeth free from all deposits and how much real filth can remain upon them while they consider themselves fastidiously neat in this direction, rise to a proper appreciation of this subject. Probably not more than one dentist in ten keeps his *own* teeth free from tartar and disease, and if *he* fails, with all the means of cleanliness in his hands, to *be clean*, how can he expect his patients to be so, without continually enforcing, not only by precept but by example, this Christian virtue. He believed no mouth in good condition if any tartar or discoloration was present. If the health of the mouth is not sacrificed the beauty is, and we have no right to mar with intent or by neglect the Temple of God in any of its parts. Pecuniarily, or as a pastime, "Good Lord, deliver us": but an avenging conscience who can withstand. "Be clean."

Adjourned, on motion, to meet at Dr. Jones'.

IOWA STATE DENTAL SOCIETY.

A very interesting meeting of this Society was held in the Keokuk Medical College, at Keokuk, Iowa, on the 21st, 22d and 23d days of July.

Several interesting papers were read, followed by discussions.

These papers and discussions showed a marked improvement in the scientific and medical knowledge of the participants.

The members have evidently been studious during the last year.

The *Clinic* also showed equal improvement, some very superior operations being performed by the members of the society.

The next meeting will be held at Muscatine, in July, 1869.

Members of the profession from other States are cordially invited to be present.

At this meeting were several gentlemen from Illinois and St. Louis. C.

ETHER SPRAY IN PERI-CEMENTITIS.

Sulphuric ether is very useful in this disease. The spray should be directed upon the crown of the teeth mostly, but the gum also should receive a portion. The operation should be kept up from ten minutes to half an hour, according to the severity of the disease. The dentalgia will cease in a minute after the application of the spray. Long continued application of the spray lowers the temperature of the roots of the teeth, and causes an expulsion of the blood from the capillaries of the peri-cementum.

Rhigoline is even better than Sulph. ether, for the above purpose. It is more difficult to *keep* it in hot weather. It should be kept on ice or in a cool cellar during the summer. C.

Mechanical Dentistry.

SALUTATORY.

The editor of the department of Mechanical Dentistry, in assuming the duties of his position, wishes to present, in a few plain words, and with a view to prevent any possible future misunderstanding, his views of their requirements.

He does not consider it to be within the purview of his department to fill the space allotted to this branch of dental science with editorials upon the subjects to which its pages are devoted, believing, rather, that it is his province to present to the readers of this journal a monthly compendium of the progress of dental art, and to leave the expression of mere theory and opinion to the gentlemen of the profession assembled in society and convention. To this end, he solicits from his readers contributions, explanatory of the progress they may, from time to time make, in dental mechanics. The editor pledges himself to the exercise of the utmost caution in recommending for the adoption of the profession any new discoveries in mechanical dentistry, and he will, so far as practicable, make a thorough personal examination of their merits before giving them favorable mention in these columns. Avoiding the extremes both of undeserved praise and of unjust censure, it will be his duty to place before the profession inventions which aspire to its adoption, and he wishes to state, finally, that any notice in the shape of a "puff," can find no place in this department, the object being to make the Missouri Dental Journal eminently practical. E.

IODIZED RUBBER.

By reference to the article on Rubber Patents, on a succeeding page, it will be seen that the great rubber monopoly of the "Hub" has at last been checkmated.

Dr. Newbrough's compound, known as "Iodized Rubber," has

virtually been declared no infringement upon the rights of the Rubber Company. Since this then is no longer a question of doubt, it becomes a matter of no little interest, especially to those who, under the law, are forbidden to use the Goodyear Compound, to know something of the relative value of this new candidate for public favor, compared with the several varieties of rubber hardened by the Goodyear process.

We have been testing it for the past few months, and can confidently recommend it as a substitute, not inferior in any respects, save color, the little extra time taken to properly vulcanize it, and care to be observed in its manipulation to insure good results. We are satisfied from a trial of it in the mouths of patients who have worn the Goodyear compound, that it is not liable to objections often urged against other compounds. It does not seem to irritate the mucous membrane with which it comes in contact. There is not that disagreable taste in the mouth often observed by wearing the sulphurized rubber.

Drs. Sill and Gillespie, of Pittsburg, in speaking of it, say: "We are using Iodized Rubber exclusively in our practice, and find it equal if not superior to the best vulcanite or Goodyear rubber. It possesses all the requisites to durability and practical utility; being both hard and elastic, and susceptible of a beautiful finish. For repairing broken work it needs no mechanical retention like the vulcanite; the new, uniting with the old, forms an inseparable union. We are highly pleased with the quality of work it produces, while its mode of manufacture insures better fitting plates."

Dr. Ross, of St. Albans, also says, "I have tested iodized rubber, both in making and wearing it. I wear it now in my own mouth. It is superior to vulcanite, in not having either taste or smell, and also in its capacity to make a better fit. With the instructions first received from Dr. Newbrough, I had much difficulty in working his compound satisfactorily. The case came from the flask unevenly vulcanized, spotted, of a dark mahogany color, and very brittle. With my present mode of manipulating it, the result is certainly very satisfactory. I now work it as follows: The plaster model is made of plaster and white

sand, in the proportion of two parts plaster to one of sand, mixed with water, to which a little salt has been added. Successive steps, same as for other compounds, till it is ready for the flask. In the flasking use plaster and sand, same as for model. Warm slightly, separate the flask and remove trial plate and all wax. Cut outlets for surplus rubber, coat the surface of the moulds with liquid silex, close the flask and place it in the oven. Apply heat, and let the flask remain subjected to a moderate degree of heat for several hours, say, eight or twelve; the object being to thoroughly dry the moulds, a point which must not be overlooked in working this rubber, as it will not harden over damp plaster. When thoroughly dry, pack while hot, being careful not to have it too hot. It packs with more difficulty than the * rubber, hence, more care should be observed in closing the flask, to avoid breaking the teeth. To vulcanize heat up gradually, to 380° in one hour, keep it at that heat for forty minutes. Cool perfectly before attempting to open the flask. Finish and polish same as other compounds." E.

STATUS OF THE RUBBER QUESTION.

The Hard Rubber Co. seem, finally, to have arrived at the end of their career, so far as the question of royalty for the Goodyear & Cumming's patents are concerned. In the commencement of their furious raids upon the pockets of the dental profession, they were generally successful in their suits for injunctions, but the injunctions were granted upon conditions, which, as a general thing, did not interfere seriously with the business of those against whom they were granted, and the difficulty of forcing money out of the pockets of those who were fully conscious of the injustice of the claims was never better illustrated. In nearly every city of importance in the Union were their claims resisted, and the expensive litigation required to enforce them at every point had probably pretty well drained their exchequer, when a reinforcement for the dental fraternity unexpectedly hove in sight, in the shape of iodized rubber, and the conflict was renewed with energy, and so far as we have

heard, with complete success. John B. Newbrough, of New York, had patented his process of hardening rubber by the iodizing process, a process entirely different from the Goodyear vulcanizing process, and a suit was commenced in the U. S. Circuit Court for the Southern District of New York, asking for an injunction restraining the said Newbrough from using rubber for dental purposes, hardened in this manner, claiming that it was an infringement of the Goodyear patent. As it was conceded by the defendant, that in the preparation of the iodized rubber a small amount of sulphur was employed—two-thirds of an ounce to the pound—it was claimed by the prosecutor that the hardening of the rubber was due to the sulphur, and therefore, an infringement of the Goodyear patent.

Affidavits from Prof. Silliman, of Yale College, Prof. Chandler, of Columbia College and Profs. Englehardt, Wurtz and Seeley, of New York, and others, abundantly established the following facts:

1. That the sulphur had no influence in hardening the iodized rubber, and was only used for the purpose of neutralizing the effect of the iodine upon the vermilion, which was used for the purpose of giving it the requisite color.

2. That iodized rubber would not harden in steam, or in other words, by the vulcanizing process.

3. That the iodized rubber hardened equally well without any sulphur in it at all.

4. That the iodized and the vulcanized rubbers when hardened were chemically two different substances.

At this stage of the case, the motion for an injunction was withdrawn by the prosecution. It is not probable that the Hard Rubber Co. will ever attempt again to obtain an injunction to prevent any one from using the iodized rubber. The merits of the iodized as compared with the vulcanized rubber for dental purposes will be treated of in another place. J.

NEW METHOD OF CONSTRUCTING RUBBER PLATES.

A few weeks since, a man by the name of Myres, claiming to be the agent of Messrs. Stuck & Owen, of Ryan, Ohio, called upon some of the members of the profession here, in St. Louis, the object of his visit being to give instruction in, and to sell the right to use a new method of manufacturing rubber plates.

This important discovery, as he claimed, of Messrs. S. & O., had just been patented by them, and they would now give the profession notice of their improvement through the medium of a dental journal. Being anxious to give the profession in St. Louis the benefit of the discovery as soon as possible, Messrs. S. & O. had sent him to act as instructor and agent.

The advantages of this new method, as set forth in his circular, were very great, while the fee for instruction and right was very small—only $20.

To the Dental Colleges he would give instruction and right gratis, those receiving the favor binding themselves in writing not to divulge the secret.

The following, taken from the circular, will give the readers of the JOURNAL some faint idea of Messrs. S. & O.'s discovery, and its advantages:

"A new method of manufacturing rubber plates, by which they are taken from the Flask, polished on both sides, and of uniform thickness. Some of the superior advantages of this method over the old process are a more perfect fit or adaptation, producing a large increase in mastication; and being of uniform thickness, like gold plate, it does away with the unnatural incumbrance in the mouth, while they are readily preferred by lovers of cleanliness, and universally acknowledged by all classes to be a nearer approximation to what an artificial plate should be. It saves all liabilities of scraping or polishing a hole in plates, and last, but not least, it saves one-half of the labor of finishing. It is the only scientific method known, to prevent a manifest tendency of the plate to rest on the arch or palate of the mouth, before striking the alveolar, which causes them to rock with the least pressure and drop from the mouth. Attention is also in-

vited to our method for re-setting or attaching teeth to plates when broken off, by which, after they are ground to fit, the fastening can be made in ten minutes, so that it cannot be noticed that they were broken.

Comment on this process is unnecessary. * * * This leaves the plate as strong and nice in appearance as before mending, and is as remunerative as any portion of dentistry. Five dollars for printed instructions in this alone has been received from different parts of the United States, England and France. Our method also, for making metalic casts or dies, from plaster impression, taken from the mouth, by which, instead of pouring in the plaster, metal is poured in the impression while in cups, and a metalic model, which is free from the liabilities and objections of the plaster model is obtained. * * * To the operator, who makes only an occasional metal plate, the price asked for the whole of these instructions is of but little consideration, compared with the value of this process alone. Prominent operators in Cincinnati, after receiving instructions, (not before), said that $25 would be reasonable for this alone," etc.

Appended to this circular were the names of several well-known operators, who were represented as having recommended it to the amount of the fee for instructions.

With these superior advantages, as set forth in the circular, and by Mr. Agent, backed by Drs. Berry, Merideth, Taylor and others of Cincinnati, a class of instruction was soon formed, instructions imparted, contracts signed, receipts of deeds given; and with the promise to send to each member of the class, immediately upon his return to Ohio, a deed of right to use, some chemically pure sheet tin, and a hardened copper wheel—articles used in the new process—Mr. Agent shook the dust from his feet and departed. The material was not at hand nor procurable, at the time the instruction was being given, hence no opportunity was given to test the merits of the great improvements.

In due time, some tin was received, as promised, but no deeds, no copper wheels, hence but part of the instruction could be made available. In justice to those who have taken instruction, Messrs. S. & O. should make their agent fulfill his contract.

We were not one of the *instructed*, and consequently, are not bound to keep the secret. We therefore propose to give the reader the benefit of what we know of this great discovery, not to harm Messrs. S. & O., they being protected, so Mr. Agent tells us, by letters patent, but to give to the profession all there is new in this department.

The method of manufacturing rubber plates is as follows: The impression is taken with plaster alone, using an ordinary metalic impression cup, altered for the purpose by cutting a hole $\frac{5}{8}$ to $\frac{3}{4}$ of an inch square, out of the centre. With the cup thus prepared, take your impression, and on removing it from the mouth, varnish and oil lightly. Prepare a little plaster, and pour it over the central portion of your impression, covering about $\frac{3}{4}$ of the palatine portion. When sufficiently hard, remove it, and, with a small knife, cut a hole through the centre of the impression, corresponding with the hole in the cup. Build up the edges of your impression with plaster, say, $\frac{1}{2}$ inch, letting the plaster extend across the arch, back of where you wish the plate to come, thus forming a cup for the receipt of the metal for your die. Return the piece of plaster which was cast over the central portion to its position on the impression, and retain it there while you fill up the hole through the cup with moulding sand. Remove the piece of plaster from the central portion. The impression is now ready to receive the metal.

The metal used is block tin. Melt at low heat, and pour as soon as sufficiently fluid. The gas and steam generated in pouring the hot tin upon the damp plaster of the impression, is supposed to find its exit through the sand in the centre. Upon this metalic model make your trial plate of sheet lead. The sheet lead used to line tea chests is recommended for this purpose. Use two, three, or more thicknesses, dependent upon the thickness desired for the plate. Take the articulation as for any other style. The teeth should not be ground to fit the model too closely, as they are liable to fracture in closing the flask.

Having the work ready to flask, cover the surface of the model with a sheet of chemically pure tin, which should be well bur-

nished down, to prevent the admission of anything beneath it. All creases or folds on the surface should be well burnished out, and then polished by rubbing briskly with a small tuft of cotton. The object of this covering of tin foil is two-fold: it compensates for the shrinkage of the metalic model, and should, therefore, vary in thickness, dependent upon size and characteristics of the mouth. It gives the polished surface to the plate; hence, the surface of the tin should be smooth and well polished. A ridge may be raised round the border of the plate, if desired, corresponding with the thickness of the sheet tin used, by not allowing the tin to extend up to the edge of the plate. Place the case upon the model, and wax up the rim. Remove all surplus wax from the lingual surface, leaving none over the palatine portion, and only what is necessary at any other point: cover the lingual surface with a sheet of pure tin, letting it extend up to the lingual border of the teeth. The case is now ready for the flask. Pack and vulcanize same as other styles. Take from the flask, polish the rim and edges of the plate, and the case is complete.

To repair a case, when a block has been broken off, grind the new block to fit the surface of the rubber, as left by the old block, as nearly as possible; drill or cut in the surface of the rubber dove-tailed holes or slots; with a hardened copper wheel, cut grooves in several directions in the lingual surface of the block. Take a little fusible metal, melting it at a very low temperature, fill the holes and slots in the rubber, and the grooves in the block, using a little more than is necessary to fill them; taking the block in one hand, the case in the other, warm them over a spirit lamp sufficiently to fuse the metal, then place the block in position, press it gently into place, forcing out the surplus metal; hold it till the fastening cools, and it is completed.

We think it will be found a very difficult matter to get up a sharp metalic die, without drying the impression a little before casting the die. The use of sheet lead for trial plates, as directed by Messrs. S. & O., was recommended for that purpose, in the first instructions given in rubber work. We hope some one will take the hints suggested by this method of Messrs. S. & O., and get up something more practical. E.

[*From the Dental Cosmos.*]

ARTISTIC OR EXPRESSIONAL DENTISTRY.

BY J. T. CODMAN, BOSTON, MASS.

The term "expressional," applied to dentistry, is new; yet I have found no name which better serves my ideas of what is intended to be conveyed by it, viz., the preservation of the expression of the features after the loss of teeth, or the restoration of the normal expression or a better one on the insertion of artificial teeth.

That the *general* mode of inserting substitutes for the natural teeth does not restore or preserve the best expression of the faces of our patients, scarcely admits of an argument. That there are dentists who make an exception to this rule is happily true, and that great general progress has been made in the past ten years toward that desirable end is also true; but that better results are attainable is certain. Doubtless, if dentists understood more of the philosophy of expression, they could attain pleasant results where they have made many failures.

That the extracted teeth are, to a considerable extent, safe guides for the form, color, size and shape of the new set is true; yet many cases present themselves where the arch has been overcrowded, and where the insertion of a full artificial set would be impossible without distending the lips and making a bad expression. In such cases it were better to omit some of the teeth, lessening the number, and insert teeth of nearly the natural size.

Among the prominent failures in the expression of the sets of the present day is that of,—1st. Color—by which they are often detected at once. 2d. Length—being often too long, and sometimes too short. 3d. Size of the teeth—often too large, and often, of late, too small. 4th. Deficiency of form of each individual tooth, or what is called "want of character," from lack of curved lines. 5th. Want of prominence and length of the eye teeth. 6th. Too great length of the back teeth, especially in upper sets. 7th. Too much evenness or similarity. 8th. The size of the arch—often too large or too broad, sometimes very much so. 9th. The horizontal line, or line of occlusion, is too straight, often looking as though both sets were made together on one piece and cut apart with a knife.

Turning from this dismal page of failures, let us give a momentary glance at the expression of character as shown in the teeth and physiognomy of animals in connection with man; for being all revelations of one power and parts of one system, they must all bear some analogy to each other.

How often we all have enjoyed the pictures of animals, dressed as human beings, exclaiming "Capital!" at these burlesques on humanity. But it is not the picture that burlesques—the animals themselves do.

That the physiognomy of the lower animals and that of man bears the same imprint may be brought to mind by the fox with his sharp-pointed teeth, his narrow dental arch, neatly covered with his trim, delicate lips. Observe how meek and quiet he looks, with his twinkling eyes half shut and his nose over his paws. Now arouse him with a rod, and how his whole expression changes; his second nature—his savage side—is uppermost, and his teeth have a most offensive look.

Then look at one of the rodents, as the rat, with his narrow, displayed incisors, with their mean, contemptible look. He is the fellow that sneaks around at night, makes holes in your mopboards and gnaws your lead-pipes, and occupies your drains. There is expression in his teeth, but to me it is of an ungenerous sort.

In contrast to these, look at the incisors of the horse, and one can hardly look at the skeleton in the Natural History Society rooms without feeling that he is grinning at you. Observe the teeth of this animal, for they are worthy of a great deal of study. It almost seems that this was the pattern that dentists took for making teeth. Observe the centrals, how broad and flat they are; how unobtrusive the eye teeth, or canines, if you like the term better. Observe the horizontal line of occlusion, and the broad, regular arch. Do we see malice in this expression? Do we not see a broad, generous nature, perhaps a little coarse, but highly amiable? Who has not heard of a *horse-laugh*—that condition of laughter when the head is thrown back, and from central to molar all the teeth are shown in the plenitude of their ivory lustre!

But my limits forbid following this train of thought further.

You will say, What has all this to do with the expression of artificial teeth? Have a moment's patience and you may see.

Observe all these animals, and let me ask you if any one of them looked as though it had in a set of artificial teeth, and you will say that the harmony of their color and the complexion and the perfect adaptation will answer that question.

Our artificial teeth should have this same harmony, and I announce that no artificial teeth *can be perfect* without harmony of color between them and the complexion.

In short, if the color is too light, they make the complexion appear ghastly; if too dark, they apparently darken the complexion.

All the faults I have named have much to do with the expression. If the teeth are too long, the mouth is opened too wide and the lips are drawn down to cover them, thus thinning the lips, giving a close-mouthed look, except when the person laughs or talks, and then there is too much display of dentistry. If the teeth are too short the lips are drawn up and thickened, giving a shrewish expression, and making it appear at times as though the person had no teeth. If the arch is too large, it takes up the lips and cheek, giving also an undue prominence to the lips, making a sensual or babbling expression, varying according to the size of the arch. Want of prominence of the eye teeth allows the corners of the upper lips to fall down, making a mournful expression. If the eye teeth are too long, and prominent or sharp, we have a savage expression. But leaving many of the criticised points, I desire to speak of size and style in giving characteristic effect.

A fine, brave, generous boy said to me a few days since, "Are not my teeth larger than usual?" "They are!" said I. I could have told him so with my eyes shut, for he had a winning, open, frank, generous manner that was not consistent with small teeth. Since then I have worked for a lad some years older, with remarkably pointed eye teeth and bicuspids, but I have no insight into his character, although he was the son of an old friend; his secretive disposition made him reserved in expression.

Show me, if you can, a person with irregular teeth, and not show me one who is undeveloped at some grand point of character; irregularity being, I contend, mostly want of development.

Take from your specimens any central tooth, and you may judge, to a certain degree, the character of the former owner. The delicate-formed slender teeth you will not call the teeth of a giant but of a delicate woman. Those sound, plump-looking teeth are a man's. Those short, yellow, small teeth are usually set in a prominent alveolar ridge and large arch; I will testify that the owner came from a long-lived family and is a great worker.

From these and similar indications, the dentist must build up his science of expression. As I have said, the natural teeth are a prominent and the best guide the dentist can have; but if these are lost beyond recovery, judgment and the eye of an artist is necessary to give or restore the normal expression.

What, then, shall the dentist do when the patient comes to him without teeth, desiring artificial ones? First, look at the patient. If the skin is light, the teeth must be in harmony. If the features are large, the teeth must be large also. If thin,

and narrow, and delicate, the teeth must be so also. If nervous and long limbed, indicated by long thin hands and feet, the teeth should be long in proportion to the width; and if, with plenty of money in his pocket, he quibbles by the hour for the lowest price, put in a set of narrow teeth, and he will be perfectly satisfied, as it will suit his character perfectly.

If your generous-hearted, full-souled friend desires teeth, and you place some small, narrow teeth in his mouth, it would be like putting teeth like those of a rat in the mouth of a horse or cow; and if in the mouth of your sharp, versatile friend you place a set of teeth, whose horizontal line shall be straight, and whose eye teeth shall be deficient in prominence, it would be like putting the teeth of a horse in the mouth of a fox or dog. And if in the mouth of your mean, sniveling person you place a generous and wide set of centrals and laterals, you give him a character better than he deserves.

I have thus sketched the outline of a very important subject of observation and study. I hope others may be able to fill up the sketch, as I have no doubt they are able to do to a certain extent, and yet there will be room for more study and more observation. If you say that some of these ideas are new I shall be pleased, for we are associated together for the purpose of bringing forth the new and the untried, that we may try them in the light of reason and experience. You have your thoughts on this subject and other subjects that interest us: please speak them—please write them. I have believed what could be said could be written. The dread of the pen vanishes with familiarity. Volunteer an essay as one of the means of improvement—that assists in concentrating the mind, which is the secret of power.

In a word, give *expression* to your mind. As the features of the face improve by dwelling on pleasant thoughts, so will the features of the mind; and when the Great Artist shall chisel away the rough human marble that surrounds the soul, I hope to see, in "the new dwelling-place," old friends with ennobled expression, won from the triumphs over material sorrows and wrung from the truest successes in this life.

[*From the American Journal of Dental Science.*]

A NEW METHOD FOR CONSTRUCTING ATMOSPHERIC PLATES.

By N. T. Folsom, Boston.

I have a method of constructing the atmospheric plates of artificial teeth so that they will not move from their places in the mouth while eating or speaking, neither will food get under them,

however difficult the mouth. I will describe it: First take an impression in wax and trim off the surplus, then press out the wax that comes against the labial surface of the dental ridge, to give room for the plaster, after which cool the wax. I now have a cup suited to the case, with which I take the impression in plaster, mixed with a solution of sulphate of potassa (Dr. Chamberlin's rule is ½ oz. to 1 qt. water,) varnish with ethereal varnish, mix the plaster for making the model, the same as for the impression (with the solution of potassa,) and then dip the impression in water and immediately pour the plaster. The next step is to examine the mouth to ascertain where the edge of the plate will extend; then mark that line on the model. Examine the mouth again to ascertain the yielding nature of the parts of this same line, note the hard and soft places, and then with a suitable instrument cut a groove in the plaster model along the entire line of the edge of the plate, about one-twentieth of an inch in width, and varying in depth from one-sixteenth to one-sixtieth of an inch. As a general rule, I commence cutting the groove in the rear of the tuberosity on the right side of the mouth. At this point I cut it deep, then shallow until I reach the soft part at the side of the back of the mouth, which I cut deeper than at any other point), then shallow again till I reach the corresponding point on the opposite side.

From the rear of the tuberosities to the canine teeth, I cut it comparatively shallow. I endeavor to cut a well defined groove around in front from canine to canine, quite deep. A plate made on this cast if not injured in vulcanizing or otherwise, will fit not only the mouth, so that atmospheric pressure is obtained, but has a packing ridge encircling it which prevents ingress of air under it, and thereby secures the pressure on the outside. I make the ridge as high all around the plate as is possible, taking care that it does not pinch the flesh on the bone; as it is not necessary to have it hurt at all to secure the plate firmly.

In finishing the plate, I do not reduce the ridge in width or height, or break its continuity. When ready to put in, I let the patient carry it to its place and after wearing it ten or fifteen minutes, if the ridge is hurting in any place, I reduce it at the point indicated, by scraping it a little until the plate sets easily. There are points along the edge of the plate where the under surface would need reducing, if no ridge was present; I reduce it and the ridge correspondingly. If after the plate has been worn a day or two, some points are bearing too hard, I reduce the ridge at those points. I had much rather have a patient come in and say that the plate is firmly fixed in the mouth, but is hurt-

ing at some point, than to have them say, they can do nothing with them, because in the first case I can correct it, but in the last I have trouble. The reason why a plate made in this way is so firmly secured, is well set forth by Dr. Davis, of New Bedford, when he says there is a movement of the plate attending mastication, and the least lifting admits the air and down comes the plate, whereas the packing ridge allows of this movement without admitting the air.

MEETING OF THE MISSOURI STATE DENTAL ASSOCIATION.

The annual meeting of the Missouri State Dental Association, held in St. Louis in June last, was well attended, and the interest taken in the discussions and the number of interesting and valuable papers presented, evidenced the life and progress of the profession here in Missouri. Many of the active workers whom we have been accustomed to meet on similar occasions, were missed at this meeting, but the number was more than made good by younger members, who, from the zeal and interest manifested, give promise of doing their share in elevating the standard of the profession.

Harmony and good feeling characterized the meeting and rendered it alike interesting and instructive. The objects of the Association were well sustained. Scientific and practical discussions occupied most of the time during the four days' session. Many of the topics discussed were practical, presenting points of interest, which were thoroughly reviewed, and much that was new and interesting was elicited. The discussion upon recession of the gums and absorption of the alveolar process was fully equal to similar discussions by any body or association in the land. The Association is in its infancy, but she has made her mark, and if she but carries forward the work she begun at the meeting in June, 1868, she may soon expect to stand in the front rank of dental associations.

A monthly journal devoted to the interests of the profession, was established, money sufficient to sustain it for one year sub-

scribed, and a committee appointed to carry out the wishes of the association in its publication.

The State and College Association were consolidated, to be known hereafter as the College Association.

A sufficient amount of money was raised to furnish the College Infirmary with the necessary operating chairs, instruments, etc., and to fit up the laboratory in the most complete and perfect manner. These are some of the steps taken at this meeting to advance the cause of dental education.

The Missouri Dental College is now the property of the association, and with this school for the proper education and training of its members, we look for great results. The profession in Missouri were among the first to recognize dentistry as a specialty of medicine, and act upon it, by establishing the Missouri Dental College upon this basis, with an extended curriculum, giving the student the benefit of a medical as well as dental education. The time is fast approaching when a knowledge of the fundamental principles of the great healing art will be required of every dental student. This fact was fully recognized by the members present at this meeting, and resolutions confirmatory of it passed.

The Association adjourned, to meet in St. Louis, the first Tuesday in June, 1869.

The following gentlemen were elected, to fill the offices of the Association the ensuing year:

H. Judd, President;
J. C. Goodrich, 1st Vice-President;
Henry Barron, 2d Vice-President;
W. H. Eames, Recording Secretary;
W. N. Morrison, Corresponding Secretary;
H. E. Peebles, Treasurer.

A synopsis of the discussions will be given in the succeeding numbers of this journal.

This report has been withheld to this late date, in anticipation of the issue of the present number of the Journal. E.

DR. MASON'S NEW FORM OF PLATINUM PIN FOR ARTIFICIAL TEETH.

We have just received a specimen of artificial teeth, with Dr. Mason's improved form of pin. This form, or arrangement of the platinum pins in plate teeth, by which the head or anchors are placed in the thickest portion of the tooth and lengthwise, while the heads for attaching the tooth to the base are arranged transversely, thereby overcoming, in a great degree, one of the principal difficulties to be met with in putting up artificial work, with the present form of pin, in the liability of the teeth to fracture when the pins are placed transversely, and the breaking loose of the pins at the base of the tooth or block, when, from being ground to fit the case, there is little left to hold them, seems to us to be a step in the right direction, and we gladly give room in our page to this and the following notice, which appeared in the January number of the *Dental Register*, hoping our manufacturers may be induced to put into the market teeth with this improvement: E.

The accompanying illustration presents an improvement in the manner of arranging the platinum pins in plate teeth, invented by Dr. John A. Mason, of Keokuk, Iowa. The advantages of this arrangement will be quite apparent to any one at first view. Pins placed transversely in any single teeth weaken them very much; but especially in narrow teeth is this a serious difficulty, one that Dr. Mason's method will overcome. We are not advised as to the Dr's. method of making these double staple pins. Their manufacture by hand would be a slow process, and not an easy one to accomplish by machinery. However, we will not trouble ourselves about that, for the mind that conceived the idea will plan for its execution. We trust these teeth, or rather teeth with these pins will be manufactured and put into the market at once. By their use a difficulty that has been long recognized as a serious one will be nearly if not altogether overcome. T.

The Missouri Dental Journal.

A MONTHLY RECORD OF THE SCIENCE.

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CAUSES OF DISEASES.

Nearly every one who has ever been engaged in the practice of medicine has undoubtedly remarked the readiness with which many account for their various forms of illness. The most diverse and improbable causes are not unfrequently adduced with the utmost confidence, and if one should make up a catalogue of causative agencies from their statements, it would exhibit a list sufficiently curious and heterogeneous. Of course medical practitioners do not usually attach much importance to the expressed opinions of patients, but at the same time in respectable medical works we not unfrequently find etiological doctrines that are scarcely more creditable than those alluded to above.

We are led to the foregoing remarks by reading an excerpt from the London Lancet, published in the Boston Medical and Surgical Journal, and which, it seems, first made its appearance in Guy's Hospital Reports, and which reads as follows:

"Amaurosis Caused by Crowding of Teeth.—In this case, (reported by Mr. Hitchcock in the Lancet of 1859, p. 80,) a boy, aged eleven years, whose sight had been previously unimpaired, found, upon waking up one morning, that he was entirely blind.

"About a month afterwards he was admitted to the Charing Cross Hospital, when it was discovered that his teeth were much

crowded, and in fact, wedged together, the jaws not being large enough for them.

"Accordingly two permanent molars and four milk molar teeth were extracted, and on the same evening the boy could distinguish light from darkness, and on the following morning could make out objects. From this time his sight rapidly improved and he was dismissed cured on the 28th, (eleven days after); the only treatment beyond the removal of the teeth being two doses of aperient medicine."

Now in this case the only evidence that the crowding of the teeth was the cause of the amaurosis seems to be that they were both present at the same time, in the same patient, and that the amaurosis disappeared after the removal of six teeth. The amaurosis, however, came on suddenly; indeed in one night, which we would hardly have expected had it been a result of crowded teeth, inasmuch as the crowded condition must have been gradually produced. We confess that the extraction of six molar teeth would be a very efficient method of treating a crowded condition of the teeth, but we would not be willing to say much for its judiciousness, inasmuch as the extraction of a single tooth would be amply sufficient to relieve a crowded denture.

Although we would not wish to be understood as expressing the opinion that amaurosis cannot be produced by such a cause, still we see in this case no evidence to induce the belief that there was any connection between the two at all, and this will especially appear to be the case, when we take into consideration the fact that at the age whilst the deciduous molars are still in their places, "crowding of teeth" is almost unknown, for in those cases in which the teeth seem to be crowded together, we only find that they have been erupted in nearly the same relation to each other as they occupied before the eruption in the maxillary bone—the canines outside and the lateral incisors inside of the arch, with perhaps their mesial surfaces turned slightly or considerably outwards, this abnormal condition being due to want of proper development of the jaw itself at the time of eruption, but no lateral force is exerted by the teeth against one another. As to the case in question the probabilities would be much greater in favor of

the supposition that the amaurosis was a result of congestion of the nervous centres, which was probably brought on by some of the common causes of congestion, and that the depletion consequent upon the extraction of six teeth, together with the "aperient medicines" was sufficient to remove it, and cure the disease.

But we referred to this case more particularly for the purpose of entering our protest against this too common practice of jumping to conclusions, and particularly to conclusions regarding the causation of disease. Salisbury discovers cryptogamous plants in the blood of patients sick with intermittent fever, and at once concludes that they are the causes of the disease.

An Italian observer finds cryptogamous growth in the intestinal mucous membrane of a subject dead of cholera, and at once concluded that the urocystis occulta, which simulates this parisitic growth, or some similar cryptogam, is the cause of cholera.

Although these minute forms of vegetable life may possibly play an important part in the production of disease, and although these investigations if directed to the determination of the laws which govern them, and the relations which they sustain to the tissues and organs, both in the physiological and pathological condition, may result in great good to scientific progress, still much labor and experimentation will yet be required to settle the vexed questions relating to etiology, and these unauthorized assumptions will not hasten the time when we shall arrive at definite results.

ESSAY ON THE DENTINAL TISSUES.

Read before the Iowa State Dental Society, July, 1868, by Dr. P. T. Smith.

In the early part of Todd and Bowman's work, On Physiological Anatomy, it is stated: "The simplest and most elementary organic form with which we are acquainted, is that of a cell, containing another within it (nucleus), which again contains a granular body (nucleolus).

"This appears, from the interesting researches of Schleiden and Schwann, to be the primary form which organic matter takes

when it passes from the condition of a proximate principle to that of an organized structure.

"The bodies of some animals, and of some plants, are composed almost entirely of cells of this kind, and in the earlier stage of development of the embryo, all the tissues, however dissimilar from each other, consist at first of nucleated cells, which afterwards are metamorphosed into the proper elements of the adult texture."

This creative process is beautifully illustrated in the development of the several parts of the dental organs. Thus the papillæ springing up from the primary dental groove are principally composed of nucleated cells, cells capable of producing by the growth of the contained nuclei other cells, similar in character and in function to those from which they have been formed. The dental papillæ increase in size by the formation of new cells from those already existing. In a short time the papillæ are contained in follicles; still, although increased in size, they are mainly composed of nucleated cells connected by a homogeneous transparent thick fluid, a blastema or plasma. In the base of the papillæ, when inclosed in follicles, blood-vessels are formed; they, however, are not immediately concerned in cellular development, but probably, by transudation through their coats, furnish the homogeneous plasma which is immediately concerned. In process of time, the precise period varying with different teeth, the follicles become sacs.

The papilla, which is now designated the pulp, assumes the shape of the future tooth, and commences to fulfill the ultimate purposes of its existence, in the formation of dentine. Previous to the development of tooth-substance, the inner surface of the sac becomes separated from the surface of the pulp, the intervening space being occupied by a soft gelatinous granular matter. This is the formative pulp for development of the enamel. At this stage of dental formation we have a closed sac containing two formative pulps, one for the development of the dentine, the other for the formation of the enamel; the former in the shape of the crown of the future tooth, the latter forming a cap over

the dental pulp. At a later period we have a matrix for the formation of the cementum.

The dental pulp, from its earliest appearance to the time of its transition into dentine, is mainly composed of a series of nucleated cells, united and supported by plasma, is supplied with vessels, and during the greater part of its existence, with nerves.

In addition to these elements, there is one other, that pertains to the pulp, prior to the commencement of those changes which prepare for its conversion into dentine. This element is a fine areolar tissue. A meshwork of delicate fibres and bands of homogeneous matter, in the thicker part of the walls of which are scattered here and there nucleated cells; while the meshes are occupied by a thick, clear, homogeneous fluid or plasma; and in this are a number of nucleated cells.

In this, the second cellular stage of the dentinal pulp, the cells have no definite arrangement as regards each other, but are scattered, at pretty regular intervals throughout the whole section. The pulp too is something firmer in this than in the earlier stage.

Immediately preceding the conversion of the pulp into dentine its elements undergo a third change. The component cells acquire a linear arrangement. Those nearest to the coronal surface are the first to take this position. The so formed columns are, as regards the pulp, nearly vertical to its coronal surface, and lie nearly parallel to each other; holding, in fact, the same relative position amongst themselves as do the dentinal tubes of the corresponding part of a perfected tooth. In a favorable section the columns of cells will sometimes separate from each other, each line of cells taking with it its share of the subgranular matter in which it is imbedded.

This is called by some writers, for the convenience of description, the third or linear stage of the pulp.

Neither in this, nor in the second stage, can there be found more than the faintest trace of the areolar tissue, which forms a conspicuous part of the pulp in its earlier stage of formation.

The blood-vessels, too, become rare in the second stage, and wholly disappear in the third.

The linear arrangement of the cells commences in those nearest the coronal surface of the pulp, first at its apex, afterwards at its sides.

Those cells on and near the surface are the largest, the relative size decreasing the farther they are removed from the surface. The lesser cells, however, increase to an equal size to the larger ones, when the time for their calcification arrives. Intermediate and connecting laterally the lines of the cells is the subgranular and now firm gelatinous tissue, corresponding in position to that described as the plasma, with which it is identical, but is now further developed. Each cell after falling into line divides into two or more in its length, and each division elongates. A central nucleus or space is seen in each cell, which lengthens with the cell. The cells by their increased length become placed end to end, and ultimately unite; and the elongated central space of each individual, by a further development, joins and opens into those of the super-imposed cells; thus forming a central tube common to the linearly united cells. At, or a little before this period of development the earthy matter is received into the cellular or rather tubular and intertubular tissue, whereby the gelatinous matrix, having assumed the required form, is converted into tubular tissue; in other words, into dentine. In some instances the linearly arranged cells have two or even three central cavities, but these, in progress of development, become joined in one. Sometimes they appear empty, at other times occupied by granular matter. In either case they are usually described under the name of nuclei.

So soon as the cells have begun to receive the earthy constituents, they become adherent to the previously formed mass of dentine, and then undergo the final development into tubes. Thus it happens, that the dental pulp, when separated from its cap of dentine, brings with it few, if any, of the calcifying cells.

Covering the pulp is a transparent membrane closely united to the external cells. This membrane, which forms the exterior of the dentine, is the first to undergo calcification. Upon its external surface are developed the hexagonal pits for the reception

of the ends of the enamel fibres, each pit corresponding to the end of a line of cells.

Calcification begins on the surface of the pulp, commencing at the apex or apices, and gradually extends down the sides and towards the centre. As the more external and larger cells become hardened, the inner ones increase in size, assume the linear arrangement, and they in their turn become converted by the addition of the salts of lime, into dentine, till at last the great bulk of the pulp is transformed, leaving only a comparatively small portion, which, with the nerves and blood vessels, occupy the central cavity of the tooth.

In the progressive development of dentine from without inwards, two of the more external unite with one of the more internal lines of cells. The two central canals also unite and form one. By the frequent repetition of this process of union between the contiguous cellular lines, as they proceed inwards and towards the centre of the pulp, the number of tubes is gradually diminished, and the trunks of the dentinal tubes are formed. Here, then, we have the ordinary manner of growth reversed. The branches are formed first, and the trunks are developed from the union of the branches.

The most external cells of the coronal dentinal pulp fall into lines, and contribute to form the ultimate branches of the coronal tubuli. The peripheral cells of the dentinal pulp of the fang do not, however, fall into lines, but exist as a coherent mass; excepting a few only, and these contribute to form those branches of the tubes that pass into the cementum. Many of the peripheral cells are like large granules, having no nuclei, while others have nuclei which become developed into cells, with which the terminal branches of the dentinal tubuli communicate. Other irregular cells are formed by intervals existing between the large granules at the time of their calcification.

SALIVA.

A Paper read before the Iowa State Dental Association, July, 1868, by Wm. O. Kulp, D.D.S.

The saliva is secreted by three pairs of large glands, and a number of small follicular mucous glands, lodged in and beneath the buccal mucous membrane of the mouth. Each of these glands secretes a fluid differing from the others. The largest of these is the parotid gland, situated immediately in front and below the external ear, extending superficially for a short distance over the masseter muscle, and deeply behind the ramus of the lower jaw. It discharges its fluids through the duct of Steno, which issues from the anterior portion of the gland, just below the zygoma, and crossing the masseter muscle, turns inwards and pierces the buccinator opposite the first or second superior molar tooth. This duct is about two and a half inches in length, its mouth is easily perceived by a prominent papilla. The fluid discharged from this gland is thin, watery, colorless and tasteless. Its density varies much, according to the circumstances under which it is secreted, being greatest whilst eating; and saliva secreted during this time, if exposed to the air, will become almost a mass of carbonate of lime. It also contains sulphocyanide of potassium, and a substance resembling albuminate of soda. This secretion seems to be intended to slake thirst as well as to assist in macerating food by the aid of mastication. From the great quantity of carbonate of lime contained in it, we are led to suppose its further use to be to furnish a neutralizer of foreign substances taken as food, which, from their chemical constituency would otherwise injure the teeth, and mucous membrane of the mouth, œsophagus and stomach. On examination, we find the proper quantity of lime wanting in this fluid in cases of indigestion, during fasting and in many inflammatory diseases. This juice is much more readily incorporated with food than that of any of the other glands. This fact might furnish an argument

of no small importance in favor of saving molar teeth, even while the rest are all gone, especially the six year old molars of young people.

We have next in order the submaxillary gland, which is situated in the submaxillary triangle. It is separated from the parotid gland by the stylo maxillary ligament: it lies against the lower jaw and digastric muscles. Its duct (Wharton's) is about two inches long. It issues from the middle of the gland, and passes between the mylo-hyoid and hyo-glossus to the frænum linguæ, and terminates by its side. It is also easily perceived by a prominent papilla. This gland has lying in a groove upon its upper surface the facial artery. The fluid secreted by this gland is colorless, thin, inodorous, and tasteless, and contains less carbonate of lime. It is glutinous, can be drawn into shreds; from this property we infer it to be intended as a lubricator by forming an anti-friction coating over the mucous membrane of the mouth and œsophagus; also over the bolus of food about to be swallowed. It also contains sulphocyanide of potassium, &c.

The last of these three glands is the sublingual, which is a long and flattened body; is situated in the floor of the mouth on either side of the frænum linguæ, covered by the mucous membrane. The lobules of this gland are more loosely connected than in either of the others. In some instances they lie apart from each other. Its fluid is discharged into the mouth by from 7 to 20 openings or small ducts, which open upon the ridge made by the gland on the floor of the mouth, the larger openings being situated on either side of the frænum linguæ. One of the larger ducts opens near, and sometimes into, the duct of Wharton. The fluid discharged from this gland is similar in appearance and chemical constituency to that of the parotid gland. It is also wanting in lime during indigestion and fasting—also in some inflammatory diseases and dyspepsia.

We next pass to the follicular mucous glands situated in the mucous membrane of the mouth. The fluid discharged by the buccal glands is tenacious and thick, contains many epithelial cells. If it is mixed with the submaxillary secretion it is said to convert starch into sugar, while it will not mix with the secretions of

the other glands except that of the submaxillary. Mixed saliva is essentially different from that secreted by the individual gland and considered as such. It is a fluid, white, or colorless, glairy, naturally frothy, is therefore a good receptacle of atmospheric air for the conveyance of oxygen into the stomach, and along the œsophagus. It contains a certain per cent. of solid matter. Its alkaline property is combined with a substance called ptyaline, from which it may be separated by carbonic acid. The ash of saliva appears as phosphate of lime, it contains but a trace of the alkaline sulphites. The chlorides of sodium and potassium preponderate in standing.

The chemical reaction of saliva varies according to different conditions of the system. It has been found to have more of an alkaline reaction during the reception of food, while at other times it seems to be of a neutral or even an acid reaction, (normally it should be alkaline or neutral at all times). The different conditions of the saliva are fine indications of the state of the digestive organs as well as of the system.

In my opinion the time is not far distant when the skillful physician will in his diagnosis use his test papers and microscope on his patient's saliva for ascertaining hitherto mysterious conditions of the system. In many instances indigestion can be traced to the insufficient quantity of the carbonate of lime and ptayalin in the mixed saliva; the correction of this would be the correction of the indigestion and consequent ailments, and this can often be done by physiological means rather than by the use of medicine; out door exercise, avoidance of starch or fat producing food, use food containing more of the solid constituents, &c.

Diet has a great influence over the condition of the saliva, a farinaceous diet will lessen its specific gravity, while animal diet will increase its gravity and its flow also. With a mixed diet and under ordinary circumstances, a healthy person will secrete from 15 to 30 ounces of saliva daily. Often abnormal conditions of the saliva, and thus of the system, are brought about by the habits of individuals: such habits as the use of tobacco or stimulants, chewing gum, a habit nearly all children are guilty of, which teachers and parents ought to rectify.

The emotions have an influence over the secretion of the glands, sometimes causing a total cessation of its flow, and always causing it to be of an acid reaction.

The uses of saliva we may sum up are threefold, 1st, Mechanical. 2d, Chemical. 3d, Physiological.

As dentists we ought not to lose sight of this division; it may guide us in our considerations of its importance in connection with our operations on the teeth. We must be able to test it and ascertain its condition, and if in an abnormal condition how to cure it, or bring it to its natural condition. The manner of testing the presence of acids, salts, albumen, &c., in substances and solutions, generally are applicable to the test in saliva, I need not therefore repeat them here. I may at some future time enumerate some of the salivary diseases and the remedies for cure.

Muscatine, Iowa, *July 15th*, 1868.

Operative and Surgical Dentistry.

HOW TO ENSURE A GOOD FACE TO GOLD FILLINGS.

A good face for fillings is something frequently spoken of by the members of our profession, but not often seen. The subject was suggested by one who appreciates well finished fillings; alas! how few of us do, judging from samples daily seen coming from the hands of the best dentists in our part of the country, (as the patient says).

I do not wish to be understood as slighted in the above compliment, for I find that my own come back in that list occasionally.

There are many things to be taken into consideration, when we attempt to make a well finished filling; the deportment of the patient, the condition of the tooth, its relative value, the position of the decay, the kind of gold used, and in what form; and last

but not least, our own condition; we should feel skillful and in harmony with the patient.

In such an article as this, I can not do better than describe my own method of filling a simple crown cavity of regular shape, margins well beveled or rounded.

Arrange for the exclusion of moisture by any of the many ways. With slightly annealed, adhesive gold, prepared in pellets, introduce one, large enough to fill one-third of the cavity. Pack toward the distal margin, allowing the gold to extend about the thirty-second part of an inch above the margin of the cavity. Retain this piece in its position by pressure of an instrument, on one part, while packing the gold with another instrument having an oval face and fine shallow serrations, under mallet and hand pressure, until the mass is uniformly *solid*, always packing against the walls of the cavity, keeping them well protected by extending pellets, adding the last pieces in the centre, and with a burnisher and mallet condense the extending gold. Dress to the desired shape with burs, and with a burnisher and heavy hand pressure, test the surface. Then use a fine cut burr and pulverized pumice, until it has the proper surface, upon which the final face finish is given with calcined rotten stone. N.

CLEANING TEETH.

Some practitioners regard this operation as unimportant, and look carelessly upon the consequences of its neglect, while others do not feel like giving the required time to this duty; but, convinced as I am of its importance, I am glad that our judicious committee has presented the subject for discussion, the more so as it has hitherto been strangely neglected by the Dental Association.

This operation is usually carelessly performed, in fact some practitioners seem to believe that a little scratching and scraping will suffice, while the truth is that such treatment leaves these organs and their integuments in a far worse condition than formerly; and they offer these services at low prices, 50 cents, 75

cents or one dollar, while I believe that most of those present will agree with me that the thorough performance of this duty is poorly repaid by a fee of $10, $15 or even $25. Gentlemen, such operators have no idea of the meaning of the term "cleaning teeth." There is no case of this kind requiring the services of a Dentist that can be finished in one sitting nor two, and three weeks and even months of constant treatment only will conquer some cases.

We all know how disagreeable and even disgusting these cases are; some have recently undergone salivation, and others have been induced by the interested advice of some travelling quack who feared that he would fail of employment on his next round, to forego the wholesome use of the brush—as actually happened a short time since up in my part of the country. But, gentlemen, however disagreeable this duty must be, it is incumbent upon us to devote to it all the time which may be required to effect a complete cure. Local applications may not prove sufficient, even in simple cases, still less in those complicated with scrofula, or syphilis: hence constitutional treatment is often requisite, and if we would uphold the true dignity of our profession, and prove to the world the justness of our claim to be called an alleviating and healing profession, we must bestow this treatment ourselves rather than refer our patients to the medical practitioner. Indeed such weakness rather tends to retard the bestowal upon our body of that public confidence which it is our aim to achieve and our boast to merit, and we should do wrong to forget that we are but just emerging from a time when the virtues of our noble science were represented by a lever in the hands of a "Knight of the Razor." Gentlemen, I have digressed thus in the endeavor to secure your kind attention and earnest interest in behalf of this branch of Dental surgery, and I hope you will handle this, as well as the third in the list of our subjects for discussion—without gloves.

This disease is more generally prevalent among the lower classes, though like caries it is no respecter of persons and attacks a majority of the human family to some extent. In the sailor and soldier we find its ravages more advanced, subsisting

as they do almost exclusively upon salted animal diet, and I think that the proportion of phosphates in the system necessary to health might be tested by temporarily ceasing to use the brush, and making a careful analysis of the quantity and character of that deposited. There is no need to refer to the cause of this salivary production, as I believe we are pretty well agreed in the belief that it originates as a precipitate from the saliva or a glandular production, and its local deposition around the necks of the teeth is believed to result through the character of the secretion eliminated from the mucous membrane, while the different forms of the teeth serve to retain it. In many cases we observe that upon one side of the patient's mouth large deposits of this formation occur, accompanied by inflamed and spongy gums, while upon the other side the teeth and integuments are healthy; this is owing to the habit of masticating upon the latter side, the friction of which prevents the formation of the deposit. The teeth and their contiguous parts suffer more from these accumulations than almost any other disease—even caries—and if allowed to proceed without interruption the gums become so morbidly sensitive that even the softest brush is a painful application. The contact of the tongue and the lips in their functional play produce painful sensations. We will now go to work, presuming the case we are to treat presents, upon diagnosis, the following character: Both upper and lower teeth covered by a heavy deposit on lingual, buccal, and labial surfaces, accompanied with acute inflammation and morbid growth of the gums. When thus affected the gums are of a dark purple colour, thick, smooth, glossy, with rounded margins. We find the surface of the gums adjacent to the teeth discharging a thin purulent matter, from which arises a most disgusting effluvia. This may be remedied by rinsing the mouth several times during the sitting with a solution of the chloride of soda or lime. This advanced stage of the disease is due first to the deposition of the tartar; secondly to dead and loose roots. Disease resulting from cachectic habits of body or strumous diathesis. (These characters seem more liable to this affection than others, and that in its worst form). We now proceed to extract all loose or dead teeth, or those which may have lost their antag-

onists. Then with a thin spear-shaped lancet puncture the morbid flesh, or with a scalpel remove it entirely by horizontal incisions, carrying the knife back as far as the growth extends, and then proceed by perpendicular incisions between the gums and the necks of the teeth down to the process, thus completely relieving these engorged capillaries of their extra accumulation, then discharge the patient. The next day deplete again, then with chisels and scalers, bent at convenient angles, chip off as much as possible of the accumulated deposit. Having finished the manipulation, prescribe an astringent wash—myrrh or rhatany with a mild aperient, or if necessary a stronger purge, as epsom salt; next sitting, proceed as formerly, not expecting to finish scaling until the gums have become healthy; continue to deplete so long as inflammation exists. I am in the habit of employing my finger in rubbing the gums vigorously so as to press out any matter that may remain about the periosteum, and in debilitated cases of prescribing tonics, as snake-root, wild cherry bark, cod liver oil, &c., and finish by polishing with pumice and burnisher. If the diagnosis reveals that green slimy mucous deposit surrounding the necks of the teeth in the interstices which are located near the gums, proceed with hoe shaped scraper to remove as much of this substance as possible, and smooth down evenly and uniformly the rough surfaces, then follow with the Arkansas stone dipped in emery powder, using a pine stick, also dipped in emery powder, until the green deposit is quite removed. Then erase the scratches made by the emery with a pine stick and pumice, and finish by polishing the surface with a broad blunt pointed burnisher. Inquire relative to use of acidulated beverages and prescribe anti-acid washes or powder and a vigorous use of the brush.

Gentlemen, if we take into consideration the disastrous consequences of the neglect or improper treatment of this disease, can we but wonder at the nonchalance with which some members of the profession regard its insidious progress. We find its results to be an altered condition of the secretions of the mouth, gradual destruction of the alveolar process, loosening and loss of the teeth, tumors, spongy excrescences of various characters,

necrosis and exfoliation of the maxillaries, hemorrhage, excessive anorexia, derangement of the entire digestive organs, catarrh, cough, diarrhœa, head-ache, and even hypochondriasis. We find that the soundest constitution may be undermined by it, and the early grave, perhaps, be its final result. Hence we perceive the importance both of directing our own minds more in this channel and of using every means of impressing upon our patients their own duty in this regard.

ALVEOLAR ABSCESS.

History.

They occur more frequently in broken down constitutions than in those of an healthy organization. They are especially liable to be observed in those who have vitiated their blood by intemperance, also those who have syphilitic or scorbutic bodies. Rheumatic diathesis is very favorable to its development. I very often see it in the mouths of the poor and badly nourished. In fact, impoverishment of the blood from whatever source is a predisposing cause for this affection.

Alveolar abscess and gum boil are sometimes used as synonymous terms; but it is wrong, for a gum boil is only a boil on the gums, and originates from no deeper structure than the submucous tissue of the gums; whereas alveolar abscess originates within the alveoli themselves. But I dislike both names, because they do not indicate the seat of the disease sufficiently. It seems to me that "peri-cemental suppuration" would be better; that name would not only indicate the seat of the disease but its *stage* also, namely, suppurative.

Diagnosis.

Alveolar abscess is a purulent collection beneath the bony plate of the alveolus. If it is of old date there will generally be seen a fistulous opening on the gum, through which flows from time to time, or maybe constantly, a purulent fluid, either pure pus, or broken down pus cells mixed with blood cells and blood plasma. There are, on some occasions, portions of other

broken down tissues, such as bone or fibrous connective tissue, cast away in the purulent stream.

If the abscess is of immediate date, a swelling of the adjacent tissues has taken place. At first there is a dull pain, which increases to a severe and throbbing pain, caused by the inflammation. The cheeks generally swell before the gum does. There is not much elevation of the gum until about the third day, then the purulent contents of the abscess have generally found egress through the alveolus and are lying in the loose areolar tissue beneath the mucous membrane of the cheek or gum. This may be known by a bagging down of the soft tissues so as to form a sort of sack, and by an evident *movement* of its contents when pressed upon called "fluctuation."

If a tooth has been the cause of an abscess, as it generally is, that organ will be sore to the touch. The least movement will aggravate the pain, and the tooth will be loose in the socket to a lesser or greater extent, according to the time it has suffered in this way. What sometimes appears to be alveolar abscess, is not the disease which I am speaking of, but *abscess of the antrum*. The latter disease will not now be discussed, and is merely mentioned that diagnosis may not be at fault. The symptoms are quite different in *idiopathic* abscess of the antrum.

It would be wrong, however, not to say here that *dental* abscess sometimes forces its way into the maxillary sinus and gives rise to complicated symptoms. For in addition to soreness and looseness of the tooth there may be soreness of the antral walls on pressure, and a discharge through the nose on the side affected.

Causes.

The most common are the diseases of the teeth themselves. Probably the dead pulp of a tooth is the most frequent. Suppuration of the pulp, in inflammation of this organ, often produces it. The "nerves" or pulps of teeth were formerly destroyed or at least devitalized with arsenic and allowed to remain undisturbed, while the cavity of decay leading to it was immediately plugged. There are thousands of teeth *now* subject to alveolar abscess which were thus treated long ago, and I am sorry to say

that some are of quite recent date, for all practitioners have not yet come up to the advanced line formed by the best operators. In the treatment of *sensitive dentine*, some practitioners still use arsenic, and often the pulp is destroyed by its presence. Teeth which have had their pulps removed and the cavity plugged rarely suppurate, although it sometimes happens. The operation of *engrafting crowns* occasionally produces an abscess. The manipulations may be severe, and the root considerably disturbed, or air or fluids may be forced through the end of the root and create or excite inflammation which ends in suppuration, and if the root canal is closed with a crown fastening, no exit of pus can take place through it, and abscess is necessarily formed in the alveolus.

Suppuration of a living pulp sometimes causes alveolar abscess, for living pulps sometimes suppurate for months in undecayed teeth, and as the pus can find exit in no other way it forces itself out through the foramina of the roots and thence through the alveolar processes. In one case I found a living pulp in a central incisor which had suppurated about once a fortnight for seven years, and still not more than one-third of its entire length was disorganized, and that the neck and crown portion.

Pericementitis is the most usual cause of alveolar abscess. When this disease has continued for a time, suppuration takes place in such excess that the pus must find exit from the alveolus.

Pathology.

This cannot be the same in all cases. When pus is formed, they press upon the pulp and aggravate the pain. They cannot in this state be absorbed to any great extent. It was formerly supposed that no pus cell could be taken up by the wall of a vein, artery, or absorbent vessel. It was considered utterly impossible for it to get through their walls without rupture of the latter. But late observations have proved the identity of cells with those of the white blood corpuscles, and experiments have shown that the latter do pass through the capillary walls. Therefore we may reasonably infer that if they can pass out, that they can pass *in*, and that therefore pus cells may be reabsorbed. That pus is reabsorbed in some shape corresponds with experience.

They may at least liquefy : the walls of the cells may become fluid in the blood plasma, and be reabsorbed by the pulp vessels. This very often happens, undoubtedly, and then there is no abscess formed. But if the multiplication of pus cells is so great that nature is unable to do so great a work in this way, then the pus forces its way by pressure through the foramen of the root, and bursting the connective tissue which is continuous with the vessels and the root itself, and which ordinarily seals up this opening, it finds itself in the socket of the the tooth. The pain in the tooth is now increased, for there is a pressure on the nerves of the pericementum. Inflammation of the latter rapidly supervenes ; the cells are filled with more plasma than they require ; swelling is the result, and the whole tooth is lifted visibly in its socket. The irritation produced by this abnormal condition rapidly extends from cell to cell of all the adjacent tissues, bones, blood vessels, nerves, gums, muscles, and mucous membrane. The cells fill themselves with plasma ; pressure of distension causes a stasis of the blood in the capillaries. If the tissues are lanced the blood will be found to be of a dark color, showing a lack of oxidation.

The pus being in the alveolus must find exit : this is done in different ways.

It may take place by a removal of the lime salts from the bone, and a liquefaction of the cells composing the animal part of the bone, so as to make an opening through the alveolus. The same changes may take place also in the periosteum of the alveolus, the gum and mucous membrane, until at last the pus cells burst out in abundance, and nothing but pure pus cells can be seen under the miscroscope.

On the other hand there may be such over excitement of the histological tissues that death takes place in one or more of them. Bone corpuscles may die, singly or in great numbers, so that osteoid substance in greater or less quantity will be found under the microscope or even with the naked eye.

Indeed large pieces of the walls of the alveoli are sometimes cast off in suppuration.

But the pus may find an easier outlet. It occasionally forces

its way down by the side of the root and exudes at the margin of the gum. When this is the case the symptoms of pain and swelling may not be so severe. Complete necrosis of the tooth is however more likely to supervene in these cases. The pus may find its exit by the side of the root in another mode also, viz.: by *forcing* its way between the root and its alveolar walls.

It sometimes forces its way between the pericementum and the cementum itself, dissecting this tissue completely from the osseous substance of the tooth itself, causing occasionally a complete necrosis of the root. If this detachment of the pericementum is complete, and necrosis has taken place, the root can never live again.

If the pericementum could be suddenly stripped from the root, and in a few moments, or even perhaps in a few hours be placed back in its original position, I can readily believe that the living cells of alveolar periosteum would unite again with the living cells of the cementum and a healthy condition ensue.

Cases have been reported where a dislocated tooth has had the periosteum scraped from the root and being placed back in its socket, has appeared to have a healthy and living connection.

The pus which forms may also be carried into the antrum, and burrow through and among the soft tissues and not appear in the buccal or nasal cavities at all. Exit is sometimes found on the outside of the neck, or face; and even in the throat, from which it is spat. Discharges sometimes take place in the external meatus of the ear.

In most cases a dead pulp is the immediate cause of alveolar abscess. The tissues chemically decompose; sulphuretted hydrogen gas is formed in abundance, which, forcing its way through the dental foramen, excites inflammation in the pericementum, and large numbers of pus cells are effused.

The pericementum sometimes forms a large tumor from itself, and a sack, or mass of tissue of its own kind will be found attached to the end of the root, or even to the whole length of the root completely hiding the shape of the root. The bone of the socket is forced to give up a portion of itself to make room for this tumor, and a large cavern is the result.

In some cases the whole external plate of bone for a considerable territory about the end of the root is histologically changed and there is no hard tissue over the abscess. Pressure over it shows the bone gone. Again we find that on injecting the roots to cure this disease that the quantity of fluid necessary to fill the abscess and the fistulous canal proceeding from it is enormous, showing a large cavity.

With such local disturbance there is necessarily a great deal that is constitutional. There is general irritative fever, headache, loss of appetite, and sometimes excessive prostration, so that patients are bed-ridden.

Teeth having their pulps dead, with the cavity of decay leading to them *open*, are not so likely to cause this disease as those which have a closed pulp chamber, for in the former case the irritating gasses can escape, whereas in the latter they cannot, except through their roots.

But decomposing food is itself a cause of this disease. The effects of this will be more particularly observed in the lower jaw. These teeth often remain several months without abscess after pulp death, and then, after becoming more decayed so as to allow decomposing food to easier penetrate the foramina of their roots, they become inflamed and cause an abscess. The teeth of the upper jaw are less likely to do this, as food is more readily washed away which has been forced into their cavities by mastication.

I do not know as there are any reliable statistics published showing the relative frequency of this affection in the upper and under teeth.

Cases that come under *treatment* are much more numerous in the upper than the under jaw, probably owing to the greater number of teeth liable to disease; it is notorious that the *under* incisors and cuspids are not one-tenth as liable to decay as the upper ones of the same class.

Consequences.

Very grave results sometimes follow these pathological conditions. Large portions of the alveoli become necrosed and have to be removed. Even the maxilla itself has had to be cut out in

severe cases. If the purulent discharge takes place into the antrum, inflammation of that cavity follows, and the fires of disease progress with great activity. The home of alveolar abscess has many times become the birth-place of tumors of malignant growth.

These grave results seldom occur in healthy constitutions; but in those which are syphilitic, cancerous, tubercular, rheumatic, &c., and those who suffer for the want of nutritious diet, together with those inhabiting places abounding in filth, impure air, and other circumstances unfavorable to good health, they are quite frequent.

Treatment.

This must be according to the circumstances of the case; as all cannot be treated alike, without regard to the condition of the system.

It is very often the case that constitutional remedies must be used, both medicinal and hygienic. To ignore the presence of syphilitic, scorbutic, and psoric taints in the constitution would often cause our efforts to cure this disease to result in disastrous failure.

It is true that mere local treatment would cure at least one-half of the whole number of cases that meet us, but we should not be satisfied with this: therefore we must endeavor to discriminate between the different conditions and adapt our remedies accordingly.

In the *acute stage*, when we find the gums congested, and considerable fever, before the abscess has opened we must use the usual measures to subdue the inflammation, or at least to modify it, for it is not often that we can remove the inflammatory symptoms until the pus or purulent product is evacuated. It can sometimes be done, however, and then the absorption of the pus takes place and there is no evacuation.

As I have before said, pus cells can be absorbed by either absorbent vessels or blood vessels, and therefore when pus is removed it may be by this method, or by a breaking down of the cell walls; a complete liquefaction of them in the plasma which they contain, and then taken up by osmotic action by the cells of any tissue in the vicinity of the abscess.

I use tinct. of aconite every 15 minutes, half hour or hour, according to the rapidity of the pulse. This will relieve the headache, as well as reduce the pulse, and tend to relieve congestion by a gentle diaphoresis. Placing the feet in hot water up to the knees will also promote this. The patient should be undressed and in bed after the foot bath.

The face should not be fomented, neither should the gums. Poultices, hot cloths and the like tend to promote suppuration, and suppuration is not desirable. These abscesses have often been coaxed to point through the cheek, thereby leaving ugly scars, by the use of external warmth.

When we are *sure* that the abscess *will discharge* somewhere, then it is better to call it to some particular point. A roasted fig may be placed over the tooth and *under* the cheek, and warmth of the part thus promoted, and the abscess thus induced to discharge its contents there.

MERCURY, *in minute doses*, is the principal remedy for promoting absorption of, or preventing the formation of pus. RESOLUTION often takes place under its influence. It should not be given so as to cause a *chance* of ptyalism, and therefore extremely small doses should be used once an hour until the symptoms are better.

The preparation of mercury which I prefer is pure quicksilver ground with loaf sugar.*

I seldom scarify the gums or produce local bleeding, as I find no advantage from it, and the operation is painful and abhorred by the patient.

If the abscess is caused by a tooth we should not meddle with that during the severe inflammatory stage, as manipulations of it would only aggravate the case; but as soon as we can, without violence, treat the tooth locally, it must be done.

If the tooth is undecayed, and not worn down so as to nearly

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* Professor Judd tells me that he often cures *incipient* abscess by *local anæsthesia*; long continued freezing of the parts by the Richardson apparatus. At his suggestion I used it in such a case with perfect success. The tooth should be frozen its whole length, which will take from fifteen to thirty minutes *Immediate* relief from pain will ensue, and in many cases will not return.

expose the pulp it will be better not to meddle with it at all, providing there has no suppurative exudation taken place. But if suppuration has occurred, we may conclude that the pulp is so much injured that it will require devitalization and removal.

If the latter has already been done in teeth which have been plugged, the plug must be removed, or another more convenient opening made to the pulp chamber, for the operation which is to follow, namely CAUTERIZATION.

This is done by forcing either kreosote or carbolic acid through the root canals, the abscess and fistulous canal which leads to the external opening.

It is desirable to have the remedy appear at the external fistula, which we may know by a white appearance, a coagulation of the tissues about the opening, or within the canal, the contents of which are forced out. Slight pain is sometimes felt as the cautery passes along the track of the fistula, or at least a sensible degree of warmth.

Sometimes the pain is quite severe, owing to the erethism of the pericemental nerves.

Usually a quantity of the cautery equal to four or five drops will be sufficient, but in old cases where quite a cavern or sack has formed in the alveolus, a drachm would be required. I would never dare to use such a quantity, however, for fear of consequences. When *much* is used, the opening through which we have forced it must be open for a day or two, or partially closed with lint, that it may have an opportunity to escape.

The day after, or a few hours after, the cautery has been thus used, there will be some disturbance of the system. There will be an increased inflammation of the abscess, with some pain and fever. These are good symptoms however, and a cure rarely fails to immediately follow. This may be known by an entire subsidence of all irritation and a healing over of the external opening. The nipple-like projection there will gradually disappear, and the place be slightly sunken, if there has been much loss of bone tissue.

If we have used but a few drops of the cautery in the operation, we may close the opening in the tooth with a pledget of cot-

ton dipped in sandarach varnish. This makes a very good temporary plug, and will act as a trial plug, that we may know whether the tooth will yet bear a permanent stopping.

When the purulent matter has had no other opening than that at the margin of the gum, there is not the nipple-like projection just spoken of.

There are occasions when we shall be unable to see the effects of the cautery externally. Cures nevertheless take place.

But if our efforts fail of cure by treatment through the tooth, then the alveolus should be trephined, if necessary, near the ends of the roots affected. But before doing this, if there is an external fistula near, then let us endeavor to force kreosote through it with a fine pointed syringe. If there is no opening we may make one through the alveolus with the dental trephine or small sharp chisels, gouges, or burrs. A short bladed gum lancet, very strong, is useful in making some clean cuts about the circumference of the bone we wish to remove. The gum should be formed into a flap over the part, so that it will hang down over the wound when the operation is finished. The parts will thus more readily heal when it is desired to close the opening. The roots should be exposed near their ends and the pericementum cauterized with kreosote. A tent of flax should be then placed between the lips of the wound, to keep it open to prevent adhesion, for the purpose of allowing suppuration to take place freely, and also for the purpose of drenching again with kreosote if necessary.

But I must not forget to tell you *how* I cauterize through the roots. Open the pulp chamber thoroughly in connection with the cavity of decay. Syringe well the root canals with tepid water. Now dry these parts with lint or spunk. Fill the pulp chamber and canals with the escharotic you wish to use, leaving a loose bit of cotton in the pulp chamber to hold it; warm a bit of red rubber of a size sufficient to fill the pulp chamber; place it in that cavity and force it onward with a blunt plugger of nearly the same diameter as the chamber. It may be necessary to continue these manipulations ten or fifteen minutes, before the kreosote shows at the external opening.

You must protect the mouth from the escharotic by spunk cut in suitable pieces and placed where desired. This operation should be done with neatness and comfort to the patient. A slovenly operation is a disgrace to the operator and a nuisance to the patient.

TUMOR UPON THE ANTRUM.

Dec. 1, 1868. H. C., a lad fifteen years old, had a small, hard lump, about the size of a shot, appear on the thin antral wall over the tooth, very near the orbital plate of the right superior maxillary. There was no pain when it first appeared, and only a slight feeling of numbness in the part led to its discovery, by pressure on the right cheek over the tumor. There are no defective teeth on that side of the mouth except a right *central* incisor, which was broken off five years ago by a blow, the pulp of which was extracted and the root plugged to the end. There is no tenderness of this tooth on percussion, or steady pressure. The gums appear perfectly healthy. I do not think this tooth is the cause. This boy was run over when four years old, the wheel of a wagon passing directly over the cheek which is now affected, causing much inflammation of the nasal passages at the time, and giving him a permanent nasal speech to this day. Therefore I suspect tumor of the exterior antral wall, or even tumor of the antrum itself.

Dec. 8. The tumor has puffed out the cheek, and has a base at least half an inch in diameter. There is no redness of the cheek, and no pain except on considerable pressure of the tumor. Still no tenderness of the broken tooth before mentioned. Every other tooth is undecayed, and without disease on this side of the mouth.

Dec. 13. Tumor has continued to increase, and this morning the eyelids are swollen and red-looking, as they often do from the effect of alveolar abscess. I examine the broken tooth, and still find no symptoms of pericementitis. At the suggestion of Prof. Judd, I drill the plug from the pulp cavity of the broken tooth;

after removing one-third of it, I find the instrument has a fetid smell. Believing now that the tumor originated from this tooth, I hasten to extract it, happy in the belief that this is the sole cause.

The pericementum is considerably thickened on one side, and at the end of the root there is a small tumor of periosteum one-eighth of an inch in diameter. No pus follows extraction, but through the day the patient spits often, owing to the bad taste coming from the alveolus, and this continues through the next day.

Dec. 14. Swelling much less, and no external inflammation. Tumor same size on the antral wall. No pain excepting on pressure of the tumor.

Dec. 16. During the last night considerable pain, and this morning lower eyelid red and swollen. No external applications but patient to take mercury thrice daily.

Dec. 17. Inflammation subsided externally—no pain except on pressure. No fluctuation in tumor, but it continues semi-hard as though formed of periosteum. Continue mercury.

Dec. 20. The tumor has been absorbed so that a mere trace of it is felt by pressure.

Remarks. January 1st, 1869.

The history of this case shows how careful we should be in our diagnosis. Two or three general surgeons saw the case and thought it a serious affair, and when reference was made to the pulpless incisor tooth, thought *that* could have nothing to do with the tumor.

That it would have proved a serious matter there is no doubt, had not the incisor been extracted, or otherwise *treated.*

The tumor was undoubtedly a white fibrous one, characteristic of periosteal tissue, in two weeks it had become about five-eighths of an inch in diameter, and globular in shape. Its absorption occupied the same length of time as its formation. C.

GOLD COFFER DAM.

This is a very useful instrument for protecting the under teeth from saliva. An impression may be taken of the tooth to be plugged and a plaster model made. Then a gold band as wide as the length of the tooth should be fitted to the latter loosely. If it does not stand alone and there is not room enough to put a band around it, then it may be made as a clasp, and encircle as much of the tooth as convenient. When it is ready to be applied warm the gold and smear softened Hill's stopping on the inside and lower edge of it, making a nearly uniform coating. While soft, apply the instrument to the tooth, and press it well down to the gum, and hold it there until the Hill's stopping is cooled and hard, which latter will be hastened by a syringe full of cold water, slowly applied.

This makes a water tight dam. It should, however, be tested before proceeding to plug the cavity. When such a portion of the tooth is lost as makes it desirable to restore its shape by "building out," the impression should not be taken until the proper form is given to the tooth by building out with wax. Then the gold dam may be used to build against, and the desired shape easily obtained. C.

FILING TEETH.

In those cases where it is desirable to use a safe sided flat file, one is often annoyed by the saw teeth on the edge of the file. These may roughen an opposite gold plug, or the enamel itself. This trouble may be obviated by beveling the saw teeth on the safe or uncut side of the file, on the hone; or we may grind off the saw teeth entirely, if desirable. C.

KEEPING CAVITIES DRY.

An approximal cavity extending to the gum or below it, is something precluded from the benefit of the wedge as a means of pressure to keep the gum from weeping. In such cases we may often find it useful to take a firmly rolled pellet of cotton wet with

sandarach varnish and crowd it between the teeth, against the gum and beyond the cavity of decay; it remains well during the operation of plugging, and being filled with sandarach gum, will not absorb water. C.

CRESCENT DRILLS.

These drills may be made by flattening the two opposite sides of round burrs on a stone, or by heating, filing and re-tempering. They are more effectual than any other drill, cutting rapidly, and are as easily sharpened on the hone as an excavator. The operator may easily have all sizes by using his old round burrs. These drills are very effectual, also, used as *chisels*; as there are many location, where they may be employed to better advantage than the straight edge chisel. C.

Mechanical and Miscellaneous Department.

TAKING IMPRESSIONS FOR PARTIAL SETS.

By W. N. Chaffee, Carlinville, Ill.

Every practitioner who is in the habit of taking plaster impressions will at once recognize the difficulty in the way of taking a perfect impression in plaster alone for a partial set, when the remaining natural teeth are long, have large crowns, small necks and incline towards each other. Having adopted a method which overcomes the greatest obstacle, namely, that of removing the impression from the mouth entire, and without injury, I offer it for the benefit of others, not having seen or heard of its being used by any one.

We will take for example a case of the superior central incisors and bicuspids. I prepare my plaster as in other cases, having near at hand *warm* water for mixing it. Select an impression

cup of suitable dimensions, preferring one with a square turned rim, instead of an oval one, as it accommodates the teeth much better. Prepare the cup by bridging across the back edge with a thin strip of wax not thicker than a knife blade to prevent the plaster from dropping over into the throat. I then soften some wax in warm water, making it as soft as possible without melting, and roll it out into a stick as large as my little finger, and long enough to pass round on the inside of the border of the cup from heel to heel. Heat the cup over a spirit lamp sufficiently to attach the wax to it, and lay the wax in around the border. The principal point to be observed in this method is expedition. After placing the wax in the cup, the plaster, mixed with *warm* water in order not to chill the wax, should be placed in the cup and be introduced into the mouth as quickly as possible while the wax is in a plastic condition. Having my patient seated in an ordinary chair, and standing at his side, I pass my left arm over the head and hold it firmly in an upright position to prevent any plaster from dropping into the throat should any happen to fall over the back of the cup, with the right hand introduce the cup, press it well up, and hold it firmly until the plaster hardens. The wax takes the impression of the teeth very kindly and the plaster gives a perfect impression of the whole palatine surface.

After the plaster has become sufficiently hard the impression can be removed from the mouth without difficulty.

If the impression is for the four or six front teeth, then I do not let the wax extend all the way round the cup, but place it on each side, letting it extend just far enough to receive the impression of the teeth, leaving the front portion of the cup to be filled with plaster.

This method suggested itself in the following case:

About one year ago a patient applied to me for a partial set of teeth; on examining the mouth I found the remaining teeth long, much smaller at the gums than at the cutting edge, and inclining towards each other. To obtain a perfect plaster impression was the object I had in view, for I consider a wax impression worthless in any case where an atmospheric pressure plate is required, I

tried all the plans of which I had any knowledge, such as oiling the teeth, wrapping with cotton, placing wax in the spaces between them, &c., &c., but failed utterly to obtain anything like a perfect impression. After having made three or four unsuccessful attempts I discharged my patient, requesting her to call again the next day. In studying the case over in my mind that night I hit upon this experiment, I tried it and succeeded in obtaining a perfect impression the first time. Since then I have made use of it in all similar cases.

It occurs to me that there is great need of improvement in our impression cups.* I seldom attempt to take an impression for a full set, either upper or lower, without first fashioning my cup with wax, which I do in this way: I form a thin rim of wax all round the cup, making it about one-eighth of an inch deeper. Before placing the plaster in the cup, I warm it sufficiently to soften the wax, so that in pressing it into the mouth should the wax rim come in contact with the muscles of the cheek it yields readily, letting the cup to its place, which gives me a deep perfect impression embracing the whole alveoli.

EXPLOSION OF A VULCANIZER.

On the evening of the 29th ulto. Dr. W. A. Cornelius, of our city, while vulcanizing some work, was seriously injured by the explosion of his vulcanizer. The cause of this accident was the use of a broken or defective thermometer. On visiting him soon after the accident we learned from him and the family the following particulars: It appears that the Dr. long ago discarded the use of the small vulcanizers now in general use, having one made from his own pattern much heavier and larger than those found in the market. He was in the habit of placing the end or bottom of his vulcanizer on the coals in an ordinary cannon stove, having the top projecting from the stove door, making use of this

* We are often reminded of this needed improvement in the form of impression cups. Will not some of our manufacturers give us something better?

means to raise the heat to 320°; when that degree was obtained, he removed the vulcanizer to the jacket over the gas and completed his work. Some two years since while heating up his vulcanizer in this manner it exploded, demolishing the stove and scattering things generally about the room. The vulcanizer passed out of the window and was picked up on the opposite side of the street; fortunately the Dr. was not in the room at the time. To avoid another such mishap, the Dr. had a safety plug inserted in the cap. This occasionally blowing out gave him trouble, as he could not stop the escape of steam, and was obliged when it occurred to stop and repair damages before he could finish the vulcanizing. To avoid this delay he had a steam cock placed in the cap over the safety plug. On the occasion of the last explosion he was using a vulcanizer from which the steam cock had been broken, and in place of a plug of fusible metal, a piece of lead had been driven temporarily into the hole made for the safety plug. As was his custom, he had placed the vulcanizer in the stove, and it having remained there a sufficient length of time to raise the heat to 320°, he was in the act of examining it when it exploded. His family being in another part of the house at the time were startled by the report; hastening to the room they found it filled with smoke and steam; the door leading to the adjoining room was torn from its hinges and found lying on the floor, and stretched upon it the Doctor. He was not insensible, but so badly stunned from the concussion that he was not able to help himself. He had received a severe flesh wound on the forehead, his left hand was badly mangled and burned, the bones of the thumb and three fingers being broken. His right hand was slightly injured, having one bone of the fore finger broken. The room presented unmistakable evidence of the great power of the agents we are in the habit of using so carelessly. The stove was broken into fragments; the vulcanizer was found with the bottom blown off in one corner of the room; the fixtures and tools were scattered in all directions.

The fact that such accidents are often occurring, and are liable to occur much more frequently from the careless manner in which the process of vulcanizing is conducted, should

lead us to inquire 1st, what pressure our vulcanizers will safely bear, and 2nd, the most reliable guide to the amount of pressure to which we are subjecting them.

That the profession as a class do not generally feel or understand the danger they are placing themselves in almost daily I am fully satisfied, and that they should know how to use with safety so powerful an agent as steam at high temperatures, all must admit.

Impressed with the importance of this subject, I have collected the following facts, to which I would direct the attention of my readers:

High steam used in vulcanizing is perfectly safe if the proper care be observed. The results of numerous experiments made by scientific men to ascertain the elastic force of steam at different temperatures, show the immense force exerted by this agent, and the great increase in the ratio of pressure, or elastic force over the increase of temperature. The following table* taken from Prof. Wildman's instructions in vulcanite, shows he increase of temperature and increase of force per square inch in steps of near fifty degrees:

				Increase of temperature.	Increase of force per square inch.	Forces per square inch.
From	212°	to	263°84′	51°85′	22.05lbs.	36.75lbs.
"	263°84′	to	314°24′	50°40′	44.10lbs.	80.85lbs.
"	314°24′	to	366°85′	52°61′	80.85lbs.	161.85lbs.
"	366°85′	to	418°46′	51°61′	132.15lbs.	294 lbs.

In this connection Prof. W. says: "This comparison shows clearly how rapidly the pressure increases at high temperatures, and warns the operator that a strong instrument, combined with care and judgment in its treatment, are indispensable to safety. Besides the rapid increase of pressure, it must be borne in mind that at high temperatures, copper, of which the boiler is composed, becomes weakened, and in a measure loses its power to resist this great imprisoned force; copper in passing from 212° to 230° F. loses about one-tenth of its strength, and at 550° it has lost one-fourth of its tenacity."

We copy from the Second Edition of Prof. Richardson's work

* From the the French Academy Commission.

on Mechanical Dentistry the following facts and observations in relation to this important subject:

"In a paper read before the Massachusetts Dental Association, Dr. A. Lawrence affirms that most vulcanizers are made of sheet copper, one-sixteenth of an inch in thickness, and agreeable to the foregoing facts, have a tensile strength of 1,875lbs.; and one of four inches in diameter will not sustain a pressure of more than 150lbs. per square inch, or a temperature of 363°. Let us next ascertain what force of steam is exerted upon the boiler within a short range of temperatures. We find by the tables of Wassell, King and others that at 320° pressure is 85lbs., at 324° 90lbs., at 328° 95lbs., 332° it is 100lbs. per square inch. These figures I have verified by a steam gauge connected with my own vulcanizer, and which I now use in preference to the thermometer, as I consider it more convenient, *safer* and less liable to accidents. *Practical engineers* concur in the opinion that a force *not over one-half* the sustaining capacity of the boiler can be safely applied."

The logical deduction from these statements is plain. If a boiler, four inches in diameter, constructed of sheet copper, one-sixteenth of an inch thick, will not sustain a pressure of more than 150lbs. per square inch, and accepting as true what is affirmed by practical engineers that a force of not over one-half the sustaining capacity can be safely applied; then every operator who, with the use of such an instrument, vulcanizes at the heat of 320° is in hourly jeopardy of life and limb.

The unreliability of thermometers in connection with vulcanizers has been recognized by many in the profession, who have testified to their uncertainty and insecurity as a means of determining with exactness at all times the amount of steam pressure employed in the process of vulcanizing at a high heat.

The *steam gauge* spoken of by Dr. Lawrence seems very perfectly to fulfill the requirements of the Dentist, and may justly claim favorable consideration from the commendation bestowed upon it by the distinguished gentleman who has brought it to the notice of the profession. The following is the author's own account of the instrument: "The gauge most suitable for the

purpose in question somewhat resembles a small circular clock, is about six inches in diameter, and marked to register one-hundred and forty, or one hundred and eighty pounds pressure, with pound dots near the outer circle of the dial; a pointer indicates the force which moves it.

Pressure in pounds.	Temperature.	Pressure in pounds.	Temperature.	Pressure in pounds.	Temperature.
60	295°	72	308°	84	319°
61	296°	73	309°	85	320°
62	298°	74	310°	90	324°
63	299°	75	311°	95	328°
64	300°	76	312°	100	332°
65	301°	77	313°	105	335°
66	302°	78	314°	110	339°
67	303°	79	314°	115	342°
68	304°	80	315°	120	345°
69	305°	81	316°	125	349°
70	306°	82	317°	130	352°
71	307°	83	318°		

"It will readily be seen by the above that a pressure of sixty pounds requires a temperature of two hundred and ninety-five degrees, by Fahrenheit's scale, to produce it, and eighty-five pounds three hundred and twenty degrees, at which latter pressure I vulcanize, running one hour, and with the most satisfactory results."

On page 245, Vol. X, of the *Dental Cosmos*, Dr. Townsend, of Philadelphia says: "I have just had one of Whitney's No. 2 vulcanizers to explode this afternoon, and this being the third one we have had to do so, I feel it no more than right the readers of the *Dental Cosmos* should know there is *some danger all the time*. Does any one know how often a boiler can or ought to be used before the metal is weakened? *One minute* before the explosion it stood 280°. We have been in the habit of heating it up to 340° and 350° for half an hour." Now if the facts already given, relative to the amount of pressure an ordinary vulcanizer is capable of sustaining, and the amount of elastic force a pressure of steam at a given degree of heat, are of any value, is it at all surprising that Dr. Townsend's vulcanizers explode? Here we have an instrument capable of sustaining *only* 150lbs. to the square inch, subjected to a pressure of 132lbs., a strain

far above that which would be considered safe by any practical engineer. Accompanying the Hays and Whitney vulcanizers is a printed circular, giving directions for the use of what is called *Hay's Fusible Safety Valve*; it states as follows: "For *greater security* every vulcanizer is provided with a safety-plug, which begins to leak steam at 350°" (132lbs. pressure) "and blows out with a sharp report at about 360°, (150lbs. pressure,) or nearly the full capacity of the instrument." How much value would a good practical engineer place upon a safety-valve, which without giving any warning allowed his boiler to be subjected to the greatest strain which it was capable of resisting. E.

DISCUSSIONS IN THE MISSOURI STATE DENTAL ASSOCIATION

AT THE ANNUAL MEETING, JULY, 1868.

Reported by W. H. Eames, D.D.S., Recording Secretary.

CLEANING TEETH.

Dr. Chase thought something might be said in reference to the *mixed* saliva of the mouth, and the calculi formed through its agency. He believed that all writers on the subject had asserted that *mixed* saliva had an *alkaline* reaction. He had been making some experiments in conjunction with Dr. Judd, and out of thirty examinations made at the City Hospital, twenty-eight showed a decided *acid* reaction, one neutral and one alkaline. By himself he had tested seventy-eight and in all of these he found a decided acid reaction. In all the cases tested the teeth were found to be more or less decayed. This seemed to upset all the dicta of authors upon this subject—thought perhaps they had been led into this error by testing only pure saliva from the large glands, and finding that alkaline, inferred that the mixed fluid of the mouth was also alkaline. Had tested the saliva of the horse in a large number of cases and found it invariably alkaline, excepting in

the case of a *sick* horse it was *neutral*. Thought this difference between the human species and brutes might be owing to the artificial mode of living in the former.

Dr. Rivers always told his patients that unless proper attention was paid to the cleaning of teeth, no filling could save them.

Dr. Judd said he had noticed cases in which practitioners had filled carefully the cavities in the teeth, but had left large accumulations of tartar about the necks and extending towards the apices of the roots of the teeth, destroying the gums and alveolar process, and still no word of warning had been given the patient by the operator, nor were the patients aware that their teeth were in any danger from this cause. All practitioners are aware that probably not less than three-fourths of all the lower incisors are lost from this cause, and this wholesale destruction of teeth can only be stopped by the careful attention of the dental practitioner.

Patients will pay for all necessary labor in cleaning teeth, as cheerfully as for any other operation, if they are only made aware of the consequences that are sure to follow if it is neglected. An operator may fill a tooth in the most perfect manner, but if he leaves a sufficient amount of tartar around the teeth to cause the destruction of the gums and alveolar process he might just as well have left them alone, for what is the use of simply plugging a cavity in a tooth when other causes which are already at work will quickly cause its destruction. A lady once called upon him who had had a large tumor upon the superior maxillary bone for many years, and upon the cheek immediately over it was a fistulous ulcer. The tumor seemed to be about one-half or two-thirds as large as a hen's egg, and had been there for about twenty years, and accompanied for the greater part of the time by the external fistula. Her physician had told her that it was an osteo-sarcoma and that it would require a very severe surgical operation to remove it. Upon examination I found the tumor to be nothing but a large mass of saliva calculus, involving the second molar tooth, which was loosened by absorption of the surrounding parts, and the external fistulous opening resulted from the constant irritation upon the soft parts kept up by the mass of tartar. The whole mass was easily removed with the tooth, and the fistula soon closed

up, and the sufferings of the patient which had been prolonged for twenty years, were quickly relieved.

Dr. Forbes said that the only difference between himself and Dr. Judd was this: He would not touch a patient who came to him with a filthy mouth. He immediately put that individual under treatment, making him cleanse his teeth. When the gums were comparatively healthy, then he proceeded to remove the tartar, and fill the decayed teeth.

Dr. Porre desired to say, that he commended the remarks upon the importance of cleanliness, and other attentions to the teeth of children. It being a conceded fact that the want of cleanliness is a fruitful source of the diseases incident to the mouth, therefore he would urge that more attention should be directed to the education of children, in the means best adapted to accomplish the desired result. During the absorption of the deciduous and the eruption of the permanent teeth, there are not only irregularities to contend with, but the gums are always more or less inflamed and sensitive, consequently it is both difficult and painful for the child to properly cleanse its teeth with the ordinary brush. He therefore suggested, in conjunction with the brush, the use of a sprig of althea, privet or similar wood, flattened and bruised at one end. The little patient will readily learn to use it, and if daily required to use it with an appropriate dentrifice, in a short time a marked improvement in both the health and appearance of the teeth and gums will be apparent, that could not be accomplished with the ordinary brush alone. We cannot enforce upon the minds of parents in too strong terms the importance of a timely and proper attention to the teeth of their children.

Dr. Barron was of the opinion that the deposition of tartar is due to the abnormal condition of the stomach and of the saliva.

Dr. Peebles, in speaking of the kind of brush best to recommend, said he had once held opinions in favor of the soft brush, but that he was convinced that he had sinned against the patients in so doing.

Dr. Black does not believe it to be his duty to do for his patient what his patient will not do for himself.

Dr. Judd said he was glad to see that experiments were making to learn something of these deposits upon the teeth. Thinks if there was less talk and more labor in this direction, more important results would follow.

We feel deeply grateful towards the many friends who have interested themselves in behalf of our Journal. We have been greeted with words of encouragement from many quarters, and we have been particularly impressed with the thoughtful care with which their interest in its success has been manifested by sending us at once the amount of their subscriptions. Although the life of the Journal does not for the present year depend upon the subscriptions alone, still we are pleased to see that the friends of the enterprise fully appreciate the fact that the "sinews" are no less necessary than words of cheer. We hope to hear from many more in the same way, and as soon as our subscription list will warrant, we will increase the size of the Journal.

We are authorized to notice that Dr. J. B. Morrison has commenced the manufacture of his new operative chair, exhibited at the American Dental Association last summer. The first lot, now in process of construction under his own personal supervision, will be finished by the first of March.

Plaster casts may be rendered so tough that they will bear the driving of a nail into them without cracking, by immersing them for a sufficient time in a hot solution of glue to permit its permeating the entire mass.—*Scientific American.*

CORRESPONDENCE.

St. Louis, Dec. 22d, 1868.

Editors of Missouri Dental Journal:

Gentlemen:—By resolution of the American Dental Association convened in July last, the Secretary was instructed to cause to be published in the Dental Journals the following form of certificate to be presented to that body by delegates:

"This certifies that..... was duly appointed a delegate to the

American Dental Association, on the.....day of....., 18..., by the Dental Society of....., and that said..... is a dentist of good character and standing, and at this time in regular practice."

Please, therefore, give this a place in your Journal.

Respectfully, EDGAR PARK,

Rec. Sec. Am. Dental Asso.

REVIEWS OF NEW BOOKS.

A PRACTICAL TREATISE ON MECHANICAL DENTISTRY. By JOSEPH RICHARDSON, D.D.S., M.D. Formerly Professor of Mechanical Dentistry and Metallurgy in the Ohio College of Dental Surgery. Second edition, very much enlarged, with one hundred and fifty-nine illustrations. Published by Lindsay & Blakiston; Philadelphia.

We are pleased to announce the appearance of a second edition of this most excellent work. To say it is the most complete and comprehensive work upon this subject is but simple justice to its merits The present edition has been brought fully up to the times and all modern improvements in the manipulations of the Dental Laboratory, and discoveries grounded in theory and confirmed by practice have been incorporated. It embraces all the subjects usually taught by the chair of Mechanical Dentistry in our Dental Colleges, and as a text book for the student is especially valuable, while to the practitioner it is a safe and reliable guide in this branch of dental science.

The subject of vulcanite base is most thoroughly treated, giving the latest improvements in the manipulation of this material, embracing Prof. Wildman's method of compounding caoutchouc.

Continuous gum work is treated in a very comprehensive style, giving, from the pen of Dr. John Allen, the author of this beautiful work, a minute description of the process of constructing it, as practiced by himself.

A chapter is devoted to aluminum, embracing all that is known of of this metal and its alloys, of practical value to the dentist. Dr. Bean's method of casting aluminum plates, also soldering as practiced by Dr. Starr.

Cleft palates and obstructions have also received that attention which the subject justly demands, and which the profession have been anxiously looking for, at the hands of Dr. Kingsley.

The work is gotten up in Lindsay & Blakiston's best style, on good paper, in one volume of 442 pages.

The Missouri Dental Journal.

A MONTHLY RECORD OF THE SCIENCE.

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MICROSCOPIC OBSERVATIONS.

The ideas entertained by those who have had no experience with the microscope, relative to the appearances presented by specimens under one of high power, are, as a general thing, far from being correct, and consequently, few are able to judge correctly concerning the merits of arguments upon mooted questions based upon microscopic observations, which are presented by different observers. I believe if we could correctly analyze the mental conceptions of such persons when their attention has been directed to this subject, we should discover nothing more than an indistinct idea of an enormous increase in size of the object magnified, whilst the characteristic appearances of the object remained unchanged. Whilst this is to a certain extent true in regard to simple magnifiers of low powers, it is very far from being the case when applied to the powers which are usually made use of in histological observations with the compound microscope. When an observer for the first time looks upon a finely prepared specimen of almost any of the tissues magnified five hundred diameters, he will find every object as strange to him as if he had but just stept forth upon the surface of a new world, in which no appearance simulated to any considerable extent any of those forms that he has been familiar with before.

He has probably heard that stagnant waters are pregnant with animalcular life, and his imagination has painted various forms

of tiny denizens of these waters, simulating, to a certain extent, some of the well known inhabitants of the watery world, having, perhaps, fins, and gills, and caudal appendages, as well as a distinct head with eyes, mouth, and dental apparatus; or, perhaps, the idea has been modeled after terrestrial instead of aquatic forms; but when he has once caught a glimpse of infusorial life under the microscope all of these visions disappear.

A moving world of globular or ovoidal masses greets his eye, and the rapid, darting motions of one variety, and the stately march of another are as characteristic of different species, or of different stages of development, as are their forms themselves. Then living filaments glide along among these other forms of life, and when a volvox globator comes tumbling across the field of vision, with every cell as brilliant as a shining gem, he would at once regard it as one of the most beautiful and wondrous members of the infusorial world. Study and investigation, however, would strip it of its apparent characteristics of animality, and reduce it to its proper level in the vegetable creation.

These myriads of rounded masses or cells, apparently without organs of locomotion, moving in various directions through the fluid without any visible cause of motion, but with evident design, present at first sight a phase of animal life sufficiently curious and interesting.

Although patient labor and investigation has succeeded in making out the locomotive apparatus, and determining various parts and organs in these minute forms, still the inexperienced observer at first view sees only the wandering cells, though in many cases as conscious that he is looking upon living forms as he would be if he could gaze upon the huge monsters that stalked among the ferns of an earlier geological era.

As everything differs in this field of animated life from what one's conception had fashioned it, so is it with the microscopic world of vegetation.

The microscopic cryptogam may be a shining cell or cells joined together like a string of beads, or a rounded mass of cells, or it may simulate a single rod or a bundle of rods, or it may assume shapes or forms as varied and as unlike any of the known

forms of plants as the imagination itself can picture, and nothing but patient labor and investigation would have discovered that it really belonged to the vegetable world.

Just so in the study of the tissues. A microscopic specimen prepared from a transverse section of the fang of a tooth and placed under the microscope, would as soon be taken for almost anything else as for a specimen of dentine. The dark wavy lines, radiating from the central pulp cavity, and breaking up into numerous ramifications near their peripheral extremities would scarcely be taken at first for hollow tubules; nor would the transparent almost hyaline intertubular substance at first be taken for the solid part of the structure. Indeed, it is probable that quite the reverse would be the case, and these ascertained facts have only been made out by an immense amount of labor and investigation.

Now, although two investigators might observe the same appearances in this case, their conclusions as to what they had seen might be widely different. One might suppose that the dark lines were due to some coloring matter, arranged in lines throughout the tissue, whilst the other might think that these lines were due to a greater density of the basal substance at nearly regular intervals, and would consequently describe it in that manner.

Two theories would therefore arise relative to the structure of dentine, not based upon different appearances observed, but upon different interpretations of the same appearances. This suffices to account, to some extent, for the differences in opinion which exist among observers upon histological questions.

Then many different *appearances* may be produced in the same specimens by a variety of circumstances: such as different modes of preparing and mounting specimens, by treating with different re-agents, by difference in magnifying power, by difference in focusing objects, by making use of reflected or transmitted light; and these differences of appearances may be modified by a thousand circumstances and surroundings, and the difficulty of making out definitely what one sees is correspondingly increased.

Therefore a great variety of observations are frequently required, made under different circumstances, before everything

that can be seen in a specimen will have been made out, and therefore, before one is qualified to arrive at definite conclusions in regard to the specimen examined. For example:

Blood had been examined thousands of times by careful observers, but with transmitted light, and no trace of a nucleus in the red corpuscles of human blood had ever been discovered, except in the embryonic state, till an examination made by reflected light by Prof. Freer, of Chicago, revealed appearances which would seem to warrant the conclusion that the nucleus that is seen in the embryonic condition is persistent through life.

One may likewise have observed that whilst mounting a specimen of dentine in balsam, that as the balsam passed slowly through the specimen from one margin of it to another, an appearance was produced which simulated to a considerable extent that appearance sometimes found in dentine, which is described by Kölliker as interglobular spaces, and an inexperienced observer might hastily come to the conclusion that Kölliker had mistaken the appearance which was produced by the balsam for his so-called interglobular spaces; but this misapprehension would be corrected, if careful investigation was pursued, by examining specimens that had not been mounted at all, in which the same appearances are found.

Keeping these facts in mind we shall be able to understand that though a life time given to microscopic observations may enable one to readily interpret many of the appearances, that to the tyro would present only a tangled web of mystery, still, no eye has yet been sufficiently well trained in this work to ensure in all cases a correct interpretation of all the forms and appearances witnessed in the microscopic world.

Taking these things into consideration, it will not be difficult to understand why authors differ so much in opinion in regard to the structure of tissues or organs; and inexperienced experimenters with these facts before them, may be more careful in advancing new doctrines based only upon a few crude and illy digested observations, leading too often to conclusions wholly unauthorized, and which a careful and experienced observer would at once recognize as illogical and incorrect.

A FEW THOUGHTS AND SUGGESTIONS

UPON PREPARATORY STUDY AND SELF-CULTURE.

By H. E. Peebles, D.D.S., St. Louis.

Believing as the writer does, that there are many honest and worthy young men, now engaged in the practice of oral surgery —dentistry; as well as many more just such men, preparing themselves for practice, that do not fully appreciate and properly value a thorough education—either literary or scientific—as a basis upon which to build a character and standing as professional men; or upon which to predicate the necessary course of study to fit them for the responsible duties incumbent upon them in the very important specialty of medicine—oral surgery—he proposes to give some suggestions in as condensed a form as he can, to the really virtuous, earnest and honest seekers after knowledge. If there are dissolute, indifferent, dishonest young men trying to filch the good name of the profession, or the unearned fee, by mean practices and false pretences, or by worthless services rendered, *this* paper is not addressed to them.

It is assumed that all good men in the profession desire its elevation and advancement. The older men especially, who remember the days when the little knowledge there was among its practitioners, was jealously guarded as professional secrets, too valuable to be uttered without a price in coin,—the days when there were no periodicals devoted to dental science, nor schools to teach oral surgery,—now hail the brightening prospects before them with joy and gladness. But at the same time they can but feel pained to see her portals darkened by those who do her no honor, and her ranks filled by such as can only disgrace her.

These reflections have been suggested to my mind by the fact that since the introduction of vegetable compounds as bases for artificial dentures, and the persuasive influence of nitrous oxide,

thousands upon thousands of teeth have been sacrificed that should have been preserved to the owners for years, and perhaps for life, but through ignorance, cupidity, and want of principle, they fall and continue to fall before the slayer.

With the introduction of these vile compounds came also a set of "Tooth carpenters" into our ranks that have done, and are still doing, much injury to patrons and profession.

Assuming this as true, the writer offers to you young men the following reflections of his own and other men's brains:

Every pursuit in life demands more or less study.

To be a thriving mechanic or a prosperous man of trade requires no little study. Whatever our calling or position in life the *understanding* as well as the body must be employed, if we expect to accomplish enough to attain a respectable position.

There are certain pursuits, however, which imperatively demand early preparatory education.

A few indeed have eminently succeeded in these without this previous study. Such a preparation is meant as only books and competent teachers could give. But they have labored all the harder to triumph because of the want of early advantages. And is it not a melancholy fact that these self teaching men but too frequently fill premature graves? broken down by toils too arduous, made necessary by their circumstances and aspirations, while early study would have saved them for usefulness and honor.

Do you ask what are those pursuits which imperatively demand study at every step, and for which early education is so indispensable? I answer the professions, especially theology, law, and medicine.

But of theology and law I have nothing to say in this paper, but pass on to the last named, to which I shall direct your attention for a few minutes:

Medicine, in its fullest sense, embraces much that we cannot stop to discuss here; suffice it to say that close and extended study is important, because so many sciences are embraced in its wide scope of knowledge. Hence it requires years of study and toil over books, before one can be fitted for a pupilage in the

profession, and then years of similar toil before he is duly prepared to assume practice in his calling, and afterward a whole lifetime of study, in order to stand a master of the profession. Because, also, the social position of the professional man is such as calls for high intelligence and thorough literary training, as well as elevated morals and refined manners.

Without these attainments and qualifications, acquired somehow, and at sometime, no one can honestly expect to acquire the position that a professional man should occupy. "That course of study which is adapted to man as man, and to the particular position of the individual, is the proper course for him to pursue.

"Man is an intellectual and a moral being: a being susceptible also of the emotions of the sublime and the beautiful; and these various capacities—intellectual, moral, and æsthetic—are all associated with a physical structure.

"In a word, he has understanding, conscience, and taste embodied in a material frame."

Every department of nature, the whole store-house of God's works, is capable of shedding light upon the path of the professional man. Every kind of knowledge acquired he may turn to good account.

He who is preparing himself for the study of medicine as a general practitioner, or as a specialist, should acquaint himself with the rudiments and general principles of all knowledge. Then only is he best qualified to cultivate those branches involved in his particular calling. In a word, he should be a good general scholar, and apt in science, to begin the study of his profession.

In this day of general education and universal diffusion of knowledge, such are the views commonly entertained concerning a professional man, the public expects him to be, not only thoroughly skilled and learned in his particular pursuits, but to be a good general scholar also.

It is too late in the day of general light for an ignoramus, or a corrupt man, or a clown, to stand fair in medicine, and equally so in our specialty.

By force of peculiar circumstances, or by dint of impudence, he may, in certain situations, and for a time, succeed; but he will,

sooner or later, be found out and despised by his professional brothers. And it is well that it is so: it shows progress, true progress, in the world.

It may be here asked, where can such a preparatory education be acquired? The answer is, undoubtedly in our established colleges.

"Their course of study,—scientific, literary, moral, and æsthetic,—together with their surrounding influences are well calculated to develop and cultivate the whole man.

"The youth who goes to a good college, determined to make the best use of his opportunities, will be sure to find there competent and often very able and scientific and literary instructors —men whose example and manners, also taken in connection with the society that usually grows up around these seats of learning—instructors, I say, whose example and manners thus accompanied can not fail to render him a scholar, a man of principle, and a gentleman. For the youth who can live for years in the midst of such influences, surroundings and privileges, and then come out a block-head, a knave, a debauchee, or a clown, shows, not the unfitness of the course of training, but his own unfitness for the place. It was a sad mistake to send that young man to college."

GENTLEMEN:

It may be, and doubtless to some of you, it is a source of regret that your early educational advantages have been limited, or, perhaps, unappreciated. But this fact cannot now be changed; it is a part of your professional history and must ever remain so. The past we cannot control, but with the present and future we may deal, in the fond hope that by a few timely suggestions we may at least to some extent aid you in the acquisition of knowledge.

METHOD in study is invaluable to the student. Without method little can be accomplished; with it strictly adhered to you may do much.

Ever fix your mind and attention upon the work you are studying. Try to grasp the subject and hold it steadily before the eye of the mind. Be not satisfied with hasty superficial views; pen-

etrate to the full depths of your author's meaning. A dreamy, listless mood can lead to nothing but vague, indefinite, or shallow views.

The student who indulges in a listless mood over his books, or in the lecture room, never arrives at certainty, and he will have little confidence in himself—neither ought he to have.

No man can ever be thoroughly acquainted with any one point, much less with the entire subject, who does not concentrate his whole mind, and bring all his powers to bear, upon the study or lecture before him.

Long experiments and much observation has clearly demonstrated that the mind expands best and is kept most healthy by bringing before it several classes of facts in alternate succession. Therefore, it is best not to confine the mind too closely to any one branch of human knowledge—to a single science, for instance; —but by varying the exercise of the mind, its health is promoted, and its vigor and tonicity is maintained.

Do not waste your time in reading poor books or bad books. A bad book may as effectually corrupt the heart and ruin the man as the practice of vice.

Read always with pen or pencil in hand, and make notes upon every book you study.

If the author mentions a valuable fact, or you find an important idea, note it.

If you doubt, or differ, with the author, write out your views on the point of controversy at once, clearly and fully.

A great advantage in this method of study is that you will gradually accumulate such a fund of materials in the various departments of science and literature, and such a facility of reference to authorities, as will best fit you for lecturing and for contributing to the periodical or standing literature of the profession.

Any one can readily perceive that the power to call up in the mind the views of different authors on any subject at will, is of incalculable benefit to the student.

Be careful to save, and turn to account, your odd moments.

In order to do this effectually it is well to always have on hand

and read, a paragraph, a page, or chapter, while waiting for the dinner bell to ring, or for the arrival of a tardy patient, or for a "case to heat up," or during such other odd minutes as so frequently are thrown away or suffered to be lost.

Lose no time.

If you will persistently pursue this plan, you will be amazed in time, when you look back upon the precious fragments of time you have thus gathered up and turned to good account.

Write and speak. By attempting to write upon any subject, you will soonest discover how very imperfect your knowledge of that subject is. This will serve to humble you, and in course of time, will lead you to more diligent, careful and thorough research. By writing much, your knowledge will become methodized—everything will find its proper place and position; and you will acquire a continually increasing facility in making all you really know at once available for your own use and that of others. This will give you strength and confidence.

The same holds good of speaking also, though not to so great an extent. To speak of what you know in an assembly or meeting of your professional brethren, is vastly more important now, and will be henceforward, than it was a quarter of a century past. Association is now an institution in the dental profession. It is one of the great levers in the machinery of our elevation; therefore, it becomes necessary that you should train your mind and your tongue to place clearly, distinctly, and forcibly before an intelligent audience, the facts and knowledge on the varied topics of professional acquirement that you may possess, as well as to defend the truth in science and ethics.

This faculty of speaking you can acquire only by study and training. Few dentists are good speakers. The peculiar nature of our practice has the effect of dwarfing our voices. We naturally acquire the habit of speaking in low tones by being so constantly close to our patients. Our mouths are in such immediate proximity to the patient's ears, that to speak loud is offensive, and hence we suppress the voice.

This becomes habitual, and when we attempt to speak before a respectable sized audience we find it very difficult to make our-

selves heard and understood. The older men in the profession know well when there was no opportunity afforded us of addressing our brothers in convention, as they did not then assemble; but let us be thankful that times and customs have greatly changed for the better; and now, it is as essential to the dental student to cultivate speaking to an audience as writing for the journals. In acquiring fluency, ease and self possession in addressing an audience, the great and prime essential, however, is entire and familiar acquaintance with the subject in hand. In a word, know and fully understand that which you want to tell others. This, with a cultivated voice, chaste expression, and gentlemanly bearing will ever secure respectful attention.

My young friends, in all the course of your studies, training and labors, fail not to learn to circumscribe your desires, and keep them in due bounds.

Ever remember that you are not your own, but that you are bought with a price.

Trust in God, and be virtuous.

Become guides and models to your associates. The young man of good habits and religious aspirations, will ever out-strip the irreligious and dissolute in the attainment of knowledge.

Humble trust and faithful prayer has a salutary influence upon the mind, as well as upon the heart of man.

When we can honestly ask our Divine Father to aid us and bless us, we feel that the Almighty is on our side, and we fear no danger.

Chicago, Feb. 1, 1869.

MESSRS. EDITORS:

The MISSOURI DENTAL JOURNAL was warmly welcomed by the profession hereabouts, as I doubt not it has been wherever it has appeared.

The ability and standing of the gentlemen composing its corps of editors give assurance that it will prove a valuable addition to our periodical literature, while it is hoped by many that it may, in part at least, supply a want which was not fully met by those previously in existence, viz: that it may with some degree of regularity, present articles giving practical instruction in those matters which our text books fail to teach. The profession is so far in advance of the latest text books in many respects, that some such articles

seem to be demanded. In fact, our periodical literature must supply the want of sufficient text books, and that journal which most earnestly endeavors to do this, deserves most the support and countenance of the profession. Whether your journal will satisfy fully the hopes of its most sanguine friends remains to be demonstrated, but there can be no doubt that it will prove in any event, very valuable to us all, and the kindest wishes of all earnest men in the profession must attend you in your new enterprise.

I have ventured to send you the following Paper upon a subject which has occupied my mind somewhat, thinking it might perhaps do some trifle of good. If you deem it worthy of publication it is at your service. With earnest hopes that your journal may have a long and prosperous life, I remain

Very truly yours,

GEO. H. CUSHING.

SOME OF THE CAUSES OF FAILURE

IN OUR PRACTICE AS DENTISTS.

It has been frequently remarked at various dental conventions, that we should learn more from the history of our failures, than from the most elaborate statements of our successes.

Believing that there is much truth in this view, and thinking it may be profitable to review the ground we occupy, I am led to ask the reader's indulgence toward a brief consideration of some of the causes of failure in our practice as dentists:

First in the list comes the prime fact of a want of proper education—that familiar knowledge of general principles which must underlie all successful scientific practice.

That this is a very general, as well as grave fault in our profession, no one will pretend to deny. The blame for this lack of proper training may not be entirely chargeable to ourselves as regards the past, but for the future the remedy certainly lies in our hands. We are none of us too old for study, while the younger members of the profession can have no excuse for failure in earnest application and devoted study for their own and the general advancement.

It is very true that our text books, as a specialty, are very meagre and insufficient, and far behind the present advanced knowledge of the profession; consequently our periodical litera-

ture must supply, as much as may be, this want. It is to be regretted, in view of this fact, that some of our leading minds have not yet comprehended the necessity for more plain practical instruction through the medium of our journals; still, as they are, the journals are invaluable instructors, and, doubtless, the demand for such practical instruction will become so apparent that we shall soon see the desired change made in our various periodicals.

But this very lack of sufficient special text books, instead of being an excuse for ignorance, should lead us to study more closely those of general medicine and science, that we may make application for ourselves of the general principles and laws which must govern in our own specialty, as well as in all others.

Another great cause of failure is to be found in our want of Faith—faith in ourselves—faith in remedies—faith in the testimony of professional brethren. Faith in ourselves cannot be very strong while the consciousness of ignorance is present with us. This faith will grow as our knowledge derived from study and experience increases; our confidence in ourselves must be in direct ratio to our assurance of intelligence. Faith in remedies and methods will depend largely upon our success in the use of them, together with our reliance upon the testimony in their favor, and faith in the testimony of our professional brethren will come as they shall prove themselves trustworthy; we shall accept their statements with greater confidence when we find them ready to acknowledge their failures. It is not to be wondered at, that there should be much scepticism with regard to the testimony of men who tell of hundreds and thousands of cases of success, and leave us to infer that they never had a failure.

The testimony of the man who claims never to fail, is to be received with a great deal of doubt; such claims stamp all of his statements with unreliability. In this connection let me remark that I cannot say how much pleasure it gave me to read in the December Cosmos for 1867, in the "report of discussions of the Society of Dental Surgeons, of New York city," the acknowledgements of some of the very best men in the profession, of their failures in some cases; not that I rejoice at their want of

success in all cases, but at their frank courage to acknowledge it. In this I see the dawn of a new era, wherein shall be broken down those barriers of foolish self-confidence and pride which have kept us apart so long, and the free interchange of experiences and the truthful statements of failures as well as success shall lead us on to a higher development in our professional life, as well as to a greater respect for one another. From the lips of such men as these, that dare to say they fail, we shall cheerfully receive instruction; our faith will be strengthened when we can repose confidence in their sincerity and honesty of purpose as evinced by such frankness.

Another cause of failure is to be found in a lack of patience and perseverance, both in our operations and in our remedial treatment of various diseased conditions. In our operations we are very apt to attempt to *force* things to a conclusion, when patient waiting or a fresh attempt would accomplish our purpose much more satisfactorily, and frequently much more speedily.

In our use of remedial agents, perhaps this impatience is more to be observed than in our general operations. We are impatient that we get no more satisfactory evidences of success at once; we think that we should see recovery stamped upon our case after the first or second application of a local remedy, or the first or second dose of an internal one, where perhaps weeks may be required in some cases to effect any marked improvement.

This lack of patience and perseverance in our operations will correct itself as we come through experience the more fully to recognize its harmful influence. I think every practitioner of extended experience will testify to the growing conviction of the necessity of this quality of patience, and can see clearly where in times past he has failed for the lack of it alone; and our younger brethren cannot too soon learn this lesson; it will save them much vexation, and perhaps mortification, if they will early act upon this principle.

The correction of this fault in the treatment of diseased conditions which require time, will come as we more fully understand the nature of disease, the philosophy of the operation of remedies, the differences in the various constitutions upon which we are

called to act, and as we learn to have confidence in the testimony of others as to the efficacy of any special remedy or plan of treatment. This understanding can only come from diligent study and earnest thought; and as we become more familiar with general principles and their application we shall find ourselves more willing to accept the testimony of others, and to give to recommended remedies and methods a fair and *patient* trial. Another of the causes of failure lies in a want of skill. This cause is not like some others, so easy of removal, and is pre-eminently a serious obstacle. Of course all skill both in operating and in remedial practice, is principally acquired, but there are some who would never acquire it, no matter how diligently and conscientiously they applied themselves; they have no faculty for acquiring this skill—no natural aptitude, and all their efforts would fail to bring them up to the standard of even mediocrity.

The duty of such men is plain. They have mistaken their vocation, and should, in justice to themselves, the profession and the public, make all haste to transfer themselves and their talents to some other field of usefulness. Then there are those who from the first evince great aptitude for the acquisition of skill, both in manipulation and in the application of those faculties which are requisite in the treatment of disease, aside from operative surgery. Again, there are those who, seeming to lack a natural aptitude, make up for it by a careful, conscientious training of the hand and mental faculties; and some such, who seem at the outset to be but bunglers, arrive in time at the highest degree of skill in all departments of practice. Now, though, as I said before, some men could never attain to any degree of skill, whatever their efforts, it is doubtless true that a large majority could so cultivate their faculties that this fault could be mainly overcome. This can only be accomplished by the most determined perseverance, coupled with a conscientious purpose to fit ourselves for the highest degree of usefulness in our chosen sphere. By taking counsel of our own failures, by copying from accomplished models, and by emulating the highest skill, we shall be surprised to see, if we put our minds to the work, how very much and how rapidly we shall improve.

Another of the causes of failure is a want of thoroughness in our operations; and it is one which cannot be too carefully guarded against. Thoroughness is the result of skill honestly applied; and though it may be considered as having been embraced in the consideration of the subject of skill, as necessarily a part of it, yet its importance demands especial notice. With all the other requisites for success, we cannot hope for the highest, without this element enters entirely into our practice, in all its departments. The thorough preparation of cavities, in filling teeth; the careful removal of all imperfect dentine and enamel from the margin of the cavities; the smoothing of the edges; the careful packing of every piece of gold—in fact, thoroughness in every step of the operation, is essential to the highest success. So, too, in the operations for removing pulps, and treating necrosis and other diseased conditions—in everything which we are called upon to perform—this quality is of the first importance. We should never rest satisfied with our operations until certain that we have done all in our power to secure the best results. Now, as I suggested in the definition of thoroughness, the want of it is only to be overcome by the honest application of our highest skill. When we have made this the rule of our practice, then we shall receive daily testimony from well-preserved and saving operations, of duty well done, which shall recompense us for our efforts, and stimulate us to pursue with greater and growing earnestness the only true path to success.

And now I come to mention as another of the causes of failure, an unwillingness to acknowledge our failures; and I think it may be properly classed as among those causes. Why is it that the cry is raised, when we hear the recital on all hands of great success in the treatment of this or that affection—the happy results attending this or that method, or the wonderful operations of this or that man extolled—why is it, I say, that the demand is made: Tell us of your failures? Simply because all success, and never a failure, is contrary to the experience of most men, and because the mass of the profession feel sure that much is to be learned from a careful study of unsuccessful practice, that could not be learned from the history only of successful

cases; because, by comparing our experience in our unsuccessful cases, we may, we must learn something tending to increase the number of our successful ones. In our profession, gentlemen in times past seem to have feared to acknowledge that they ever failed, lest they should not take as high rank as some who had arrogated to themselves positions perhaps a trifle too high for mortals to aspire to. This is not so in the medical profession. You scarcely can read of the debates in any of their societies, wherein some of their best men do not confess a failure and ask boldly for counsel. And should it not be so in our profession? I consider that, in view of the youth of our profession, and consequently of the meagreness of our literature, it is peculiarly our duty to be thus frank in our councils, withholding nothing that we know, nor the confession of ignorance where it exists. Let us, then, remove, as far as possible, this impediment to success, by breaking down entirely the foolish barriers which have separated us so long, and come to our discussions, both in our societies and through the journals, prepared to freely exchange our experiences, both successful and unsuccessful, and we may be sure that we shall have our reward.

In the foregoing remarks, two classes of individuals, who claim to rank in our profession, have not been addressed. One is that class whose highest ambition is to secure their fee; the other is that class who think there is nothing worth the seeking, outside the narrow limits of their contracted intellects. The first *have* no failures so long as they can fill their purses; the latter acknowledge none to others, if they do to themselves. To such as these this subject will have no interest; but to those of our profession who feel the responsibility of their positions, who are striving to elevate themselves, and the profession as well, who are seeking for the highest reward for honest endeavor—to these, I feel that the consideration of this subject, imperfectly as it has been treated, will not be inopportune. There is scarcely a day passes that I do not feel the embarrassment which some one or all of the causes of failure, heretofore enumerated, must occasion—want of knowledge, want of faith, want of patience, want of skill—all, at times, coming between me and the desired

success. And, I presume, others will bear the same testimony. I feel sure that a careful, thoughtful consideration of the causes of failure in individual application must tend to remove those causes, and we can but feel encouraged to hope for greater progress when we see men like W. H. Allen and others of prominence, frank to acknowledge their failures. It gives a man greater courage than might be supposed, to pursue the onward path, when he sees men preëminent in the profession taking counsel together of their failures.

We know something of the great success of such men, and are led to hope that under this spirit of frankness which is as ready to give as receive, we may by perseverance and study so far overcome the obstacles in our way, that eventually our successes shall bear a fair proportion to our failures. We must remember that there is no easy, short cut to success—the path lies one way alone, and we can only reach the goal by toilsome climbing over the rough and thorny path. Earnest application, dilligent study and patient investigation, conjoined with honesty of purpose—these all must combine to lead us where our steps should tend; and true success can only come by these. Let us, then, press forward with a devoted purpose to this end, and with broad charity toward one another, climb hand in hand the pathway to success.

Operative and Surgical Dentistry.

A CASE IN PRACTICE.

Reported to the St. Louis Dental Society, by Edgar Park.

Mr. President and Gentlemen:—In compliance with a request made of me at the last meeting of this Society, I shall present as briefly as possible the peculiarities, requirements and treatment of the following case.

In September last a gentleman called upon me complaining of a general sensitive condition of his teeth, and of the especial

sensitiveness of the left superior bicuspids, wishing me to examine them and do what was necessary for his relief.

His teeth were of good quality, those of the upper jaw occluding directly upon those of the lower—this articulation resulting in the loss of a considerable portion of the crowns.

This explained the general sensitive condition, the teeth being worn to such an extent that the pulps were affected by the action of penetrating agents, and exposure to sudden—even moderate—changes in temperature. Between the bicuspids where the most severe pain was experienced, a cavity in each tooth existed deeply decayed and exceedingly sensitive, as indeed were the coronal surfaces of all the teeth to the application of an excavator. There were deep abrasions also, in the cuspid and bicuspid teeth just below the margin of the gum.

All things considered—the quality of the teeth, the healthy condition of the surrounding parts, and the constitution of the patient, I advised protecting the teeth from further abrasion by substituting gold for the lost portions of the crowns.

After a careful explanation of his case he arrived at a realizing sense of the magnitude of the undertaking.

Believing that filling the approximal cavities in the bicuspid teeth would afford him no permanent relief, I refused to fill them, or indeed to perform any operations other than those which seemed to me to be required.

After a few days' consideration of his unfortunate condition, he presented himself again, and expressed his desire to have the operations performed.

The greater damage having accrued to the superior teeth, to those at once my attention was directed, commencing operations upon the second left superior bicuspid, preparing the tooth to receive the gold in this manner. The abrasion at the margin of the gum in this tooth being deep and wide, a groove was cut between the enamel and dentine on the crown, and the portion below the buccal abrasion removed, exposing the approximal cavity.

One continuous filling was now all that this tooth required, substituting the anterior buccal and coronal surfaces. A thin

separating file was passed between the teeth. The cervical wall of the buccal abrasion was undercut, and made continuous with the margin of the approximal cavity. After excavating this cavity and finishing the margins, a groove was cut on the coronal surface between the dentine and remaining plates of enamel.

The operation of filling in this instance was commenced by the introduction of a cylinder into the cervico-lingual portion of the cavity. This foundation being secured, the filling was carefully continued along the cervical wall of the cavity, down the lingual wall, and into the groove in the crown, by condensing small pellets of adhesive foil ; and the whole process of building up accomplished with pellets.

(This filling had subsequently to be removed in consequence of the death of the pulp, and the tooth refilled.)

This description applies to the adjoining bicuspid, with the exception that the labial wall was left undisturbed, and the abrasion below the gum filled independently.

The canines and incisors having no caried cavities, were prepared by first separating slightly, to admit of condensation from all directions. A few retaining points were made with a drill and grooves cut connecting them. The grooves and retaining points were filled carefully and thoroughly with small pellets to secure as perfect a foundation as possible. After producing a dense even foundation covering the surface completely, gold was prepared by folding sheets into ribbons, the width of the tooth, and cutting into pieces as near the size of the surface of the filling as possible. These were condensed one upon another with a foot-shaped instrument, very finely serrated.

This preparation of gold seems desirable in operations of this description, the necessary density being attainable with much less labor than by the use of pellets, in the use of which innumerable angles have to be broken down, and beaten so that the surface presents a uniform density.

This economization of labor of course affords a corresponding economization of time to the operator ; and to the patient, an avoidance of unnecessary fatigue and pain.

For condensing the other surfaces of the filling small pointed

pluggers were used, because of the want of uniformity consequent upon the varying in size somewhat, of the different planes of gold.

The molar teeth were filled by the same method. In the preparation of those teeth to receive the gold, however, retaining points only were formed. With a large sized drill a cavity was made in each cusp, and with a hatchet-shaped excavator somewhat undercut.

It is obvious of course to all that it is of the utmost importance that the foundation shall be absolutely perfect—that the mass of gold shall be as solid as it is possible to make it from the bottom of each retaining point, to every surface of the plug.

Feeling disposed to produce for the patient, operations which would afford him the greatest amount of service, the fillings were finished with plain triturating surfaces at the expense of artistic excellence.

To have built cusps upon these plugs, considering the peculiar occlusion of the jaws, and a habit of constantly triturating the lower against the upper teeth, would, I think, have been folly.

Greater results can scarcely be expected from substitutes than from the natural organs.

The sensitive condition of the teeth was of course not at once relieved by the operations. Indeed for a time they were more sensitive than before, to the application of heat and cold—much to the patient's concern for the time being; though they are now perfectly comfortable and used with the utmost satisfaction.

The inferior teeth will be operated upon in the same manner as were the superior. The operations however will be less prominent. Shall first operate upon the posterior teeth filling each tooth in turn as it occurs, towards the anterior portion of the mouth. This is undoubtedly the best course to adopt in all cases, where the crowns of the whole arch are to be restored: instead of building intervening obstacles behind which to manipulate.

In the above series of operations protection from moisture was secured by the use of Barnum's rubber dam—and while speaking of this auxiliary in operations upon the teeth, I desire to say, if you will pardon a moment's digression, that to Dr. Barnum the

profession is deeply indebted for one of its most invaluable appliances; to our appreciation of which expression should long ago have been given. So invaluable an acquisition to the operative dentist ought not to go unacknowledged.

The contributor certainly merits the assurance of our appreciation; and I would suggest that some action should be taken having for its object the tendering of a deservedly handsome testimonial expressive of the high estimation in which his appliance is held by the dental profession of the United States.

DEVITALIZING THE DENTAL PULP,

AND TREATMENT PREPARATORY TO FILLING.

By I. P. Wilson, Iowa City, Iowa.

When teeth are so badly decayed as not to admit of a chance of saving the pulp alive, I have practiced the following treatment with gratifying results.

And in writing on this subject, I shall particularize for the benefit of those who have no regular method of treating such teeth, and consequently have poor success, if not entire failure:

Before treatment I remove but little disease from the cavity—perhaps only syringe it out with warm water. If it is an approximal and the decay extends below the margin of the gum, it is important that an application of sandarac varnish be made to that portion of the gum exposed to the cavity, that the absorbents may be closed. If this precaution is not observed, the arsenious acid will act upon the surrounding parts, pericementitis will follow, and a failure is the probable result.

This being done I take a small pellet of cotton, moisten it with creosote, touch one side of this to arsenic, (either dry or in paste) and apply directly over the pulp.

Another pellet of cotton saturated with sandarac varnish should be in readiness, and applied over the first, filling the cavity full. This will harden, and prevent the arsenious acid from escaping into the mouth and doing injury.

I now dismiss my patient with directions to call again in just 24 hours. At the expiration of this time I remove the sandarac plug, and almost invariably find the pulp dead, so that it can be removed with little or no pain.

At this sitting I generally prepare the cavity for filling, by removing not only the bulk of the pulp, but the nerve vessels in the dental canals, so far as it is practicable to do so; and in order to do this, I sometimes find it necessary to enlarge one-third or one-half the length of the canal with a bur drill, that I may gain access to the root vessels, and thereby make the operation much more thorough, and I believe productive of better results.

But we frequently find the nerve vessels alive, and quite sensitive, but the pain is only momentary, and generally ceases as soon as the instrument is withdrawn.

In such cases I have been in the habit of entirely extirpating these vessels if possible, believing if this is not done, they will afterwards perish, and become foreign matter. This may be done with a broach, or by making a second application with arsenic. The former I consider a much better way, and always practice it when my patient will allow me to do so.

In using arsenic a second time, it circulates more generally throughout the entire structure of the tooth, reaching perhaps the nutritive vessels of the periosteum, and thereby cutting off all sources of nourishment to the tooth, and it becomes necrosed. I do not believe that a second application of arsenic will produce such results as this as a rule, but it is *liable* to do so, and therefore barely enough should be used to accomplish the object, and *no more.*

The cavity being prepared, I rinse it with warm water, dry it thoroughly, and then force creosote into the canals on very small pieces of cotton, or thread is better, as one end of it can be left in the outer cavity, by which it can be removed very readily.

This being done I request my patient to call again in a week or ten days. I then remove the temporary filling, and ascertain the condition of the tooth.

If it should be elongated, and concussion produces pain, I would not plug, but commence treatment for pericementitis.

And if the small piece of cotton or thread in the root canals should produce a fetid odor, and indicate an unhealthy condition, I would not think of filling, but would rinse out the canals thoroughly with warm water, and again apply the creosote, and so continue to do from time to time, until a normal condition is present. But if on removing the temporary filling, I find the tooth in a good condition, I proceed at once to fill the canals, (if I have gained access to them,) and then the main cavity.

In cases of this kind where an expensive gold filling is required, I think it best as a general rule to put in a *test* plug at first, and then if all is well, fill it with gold from two to four months subsequently.

But a word in regard to these *test fillings:* When the oxychloride of zinc is used for this purpose, it is simply *no test at all*, as it is very porous, and the gases can easily escape through it. I would therefore prefer Hill-stopping for this purpose, or at least I would close up the openings into the canals with the Hill-stopping, and then the oxychloride may be used for the balance of the filling if it is preferred.

This has been my method of treating such teeth, and I have very seldom had any further trouble with them.

I do not know that I am offering anything new on this subject, but trust the above suggestions may serve as a guide to those who have heretofore been unsuccessful in the treatment of such teeth.

CASE OF SALIVARY CALCULUS.

Reported by WM. H. THRIFT, D.D.S., Boonsboro, Iowa.

In the last number of the MISSOURI DENTAL JOURNAL I observed a discussion upon this subject which took place at the last meeting of the State Association of Missouri, and am glad to learn that the profession are alive to its importance as a cause of disease.

I will relate a case that came under my observation, and perhaps it will prove of some benefit to the profession.

On the 16th of May last, Wm. S. called at my office and desired me to examine his mouth, and on examination I found it to be a case of salivary calculus, concerning which he made the following statement:

"The difficulty commenced about my twelfth year, and has from that time gradually increased.

"The deposit has been entirely upon the right side, the teeth and gums upon the left side having been healthy. I have consulted medical men and have been told that it was a bony tumor, and that an operation would be necessary some time to save life."

With great difficulty I succeeded in convincing him that it could be removed with little pain.

The deposit was upon the first superior right molar, as large as a walnut, enclosing the tooth and roots, and on removing it the tooth necessarily came away also, leaving the jaw-bone exposed. The molars and bicuspids of the same side were also covered with tartar, but absorption of gums and alveolar process have not gone on sufficiently to destroy the usefulness of the tooth.

After removing all traces of tartar the patient was directed to use astringent washes, and I had the satisfaction of soon seeing the mouth in a healthy condition.

I account for the tartar being found only on one side by the fact that he masticated entirely on the left side.

TREATMENT OF EXPOSED PULPS.

By J. N. Crouse, D. D. S., Chicago, Ill.

On this subject, I find two articles in the Missouri Dental Journal, by Editor C.; one styled "Oxy-Chloride of Zinc;" the other, "Saving the Pulp Alive." I combine the two for the reason that both relate to the same subject. C. seems to think saving freshly exposed pulps a sure thing. He goes still farther, and thinks it well "whenever favorable opportunities occur for watching the case, to try the experiment of saving even suppurating pulps."

To my mind, C. has not been very explicit; yet it is evident

that his sure method of saving freshly exposed pulps, is to wipe the cavity with creosote, cap with Hill's stopping, and plug with gold immediately. He does not think oxy-chloride of zinc a reliable test filling, for the reason that the consequent gasses, formed by the decomposition of the pulp, escape through the innumerable pores of the zinc. He therefore recommends Hill's stopping. Now, if in the course of his experiments, C. should find the pulp gone in the teeth in which he used zinc over the exposed pulp and over that Hill's stopping, I should think he would come to the opinion which I now entertain, that he is mistaken about the "gasses escaping through the pores, and would then conclude that some other change had taken place. While I, with Dr. C., am living in anticipation of some better method of treating exposed pulps than by destroying the vitality with arsenic and removing, yet I have no idea that we can, either with zinc or Hill's stopping, save the life of the pulp when really exposed. Perhaps oxy-chloride of zinc will by some process cause the pulp to become atrophied or the substance of the pulp absorbed, and the tooth do well thereafter. That is to say: perhaps (?) a better method than destroying the vitality of the pulp, when exposed, with arsenic, is to use over the point of exposure zinc, and fill the balance of the cavity with gold. If this can be done and the tooth do well, then we have an improvement over arsenic. Careful experiments by reliable practitioners will in time give us some valuable information in this direction. As yet we have only experiments. Capping with Hill's stopping, as practiced by Dr. C. is old; having been tried and abandoned by the majority of practitioners years ago for the reason that if not in all, in a very great majority of cases the pulp dies and gives trouble sooner or later; resulting many times in alveolar abscesses caused by the decomposed pulp. It is my conviction that the life of the pulp, when exposed, cannot be saved by this method and I think Dr. C. will lose faith in it if he watches closely for a few years each case he thus treats. I allude to pulps that are, beyond a doubt, exposed, not contending that the life of the pulp of a tooth which is nearly, but not wholly exposed, cannot be saved by this method. It is in such cases that this practice proves successful, and where the pulp is exposed gen-

erally proves unsuccessful, so far as the life of the pulp is concerned, either with metal or Hill's stopping for cap, with or without an arch over point of exposure. Therefore, I think Dr. C. assumes too much when he says "No one thinks of destroying freshly exposed pulps." Had I not seen his article, I should have said no one thinks of saving an exposed pulp. I am now, however, using oxy-chloride of zinc, in favorable cases, over exposed pulps; hoping, in time, with my own experience and the experience of others, to be able to decide whether or no it is a proper material for this purpose. In conclusion, I would suggest that Dr. C. tell us, in his next article, which he promises on this subject, how or by what method he hopes to save suppurating pulps.

[The foregoing was handed me too late for full comments in this number, but I refer the reader to the January No. of the JOURNAL for the articles criticised by Dr. Crouse.

It will be seen that I did not attempt to give "a sure method of saving freshly exposed pulps." Twenty-five years of practice and observation has given me so good an opinion of saving "freshly exposed pulps" that I shall continue the treatment. C.]

HORNS OF THE PULP.

It is understood by the "horns of the pulp" those prolongations of the dental pulp that run far up into the cusps of the bicuspids and molars. Every one should acquaint himself thoroughly with the position of these horns, so as to avoid them in excavations. It should be borne in mind that they run much farther into the cusps of young teeth than of those more matured. I occasionally see these prolongations continued quite to the enamel. They are not to be discovered by color when they extend thus far, but the excavator will sink into a crevice and give the patient unusual pain. One may be deceived and think that this is only sensitive dentine; but the pain produced in this particular location should warn the operator that he is at work in dangerous proximity to a living nerve.

The blood vessels do not carry *red* blood to the end of these horns in many cases, and you may wound them or even cut out portions without seeing a red globule. And this is why one may

be so deceived that he will go on cutting this sensitive, colorless pulp without restraint, notwithstanding the protestations of the patient that the operator is "touching the nerve."

It is now generally known that nutrition may take place in large territories of soft or hard living tissues without blood-vessels near. Food passes from cell to cell without the agency of either red or white corpuscles.

Excision of these *colorless* horns is well borne by the main body of the pulp, and plugging need not be delayed on this account if it has taken place accidentally.

But gold should not be forced into the cavity occupied by the horn, as it is too good a conductor of heat. My practice in these cases is to press a portion of "Hills Stopping" against the exposed nerve, gently, not too hard. I desire the stopping to touch the pulp and prevent its growth into the cavity of decay.

I prefer "Hill's" to "Oxy-chloride," for I do not wish to cauterize. C.

A NEW STYPTIC, PENGHAWAR DJAMBI.

Our attention was recently called to this article by Prof. O. F. Potter, of the St. Louis College of Pharmacy, and from the trials since made of it we can confidently recommend it as a valuable addition to our class of styptics. For the special uses of the Dentist it seems to be peculiarly adapted. It acts promptly, is simple in its application, and there is no disagreeable taste nor unpleasant action observed in its use, objections which are often urged against other remedies of this class. This substance is the hair like scales with which the stems of a certain species of tree fern, found in the Isle of Java, are covered. As found in commerce, it presents a soft, silky, fibrous appearance, resembling somewhat asbestos, except in color, this being of a brownish yellow. Prof. Potter, in an article published in the St. Louis Medical Reporter, No. 11, says of it:

"The French surgeons gave it some celebrity some years ago, and it was then asserted that its power was so great that the most extensive hæmorrhage could be instantly checked by its applica-

tion. But as this was soon found to be untrue, it, like many other valuable remedies, by overrating its virtues and thereby producing disappointment, soon fell into disrepute and neglect. According to Dr. Vinkle it arrests hæmorrhage, even arterial, unless the diameter of the artery be more than one and one-half lines, more readily than any other application. He says also that it produces a coagulum, even in cases where the blood has changed so much that it has nearly lost the property of coagulating or when the walls of the vessels are so diseased that they are incapable of a plastic process. He ascribes its power of controlling bleeding to capillarity, the scales being made up of jointed tubes which absorb the watery part of the blood, and at once swell to five times their natural size. It is also shown that alkaline liquids exert a particularly rapid action on the hair-like scales, dissolving the cell contents and making the cell membranes swell. Thus these bodies when applied to a bleeding surface, rapidly abstract the fluid part of the alkaline blood, leaving the fibrin to coagulate. The Penghawar acts better when crumpled than when entire, or so that the filaments are directed perpendicularly against the bleeding surface, as then the open cells come more directly in contact with the blood, and are also the better enabled to enter the open vessels and produce compression."

In cases where continued hæmorrhage follows the extraction of teeth, if from the margins of the gum, a compress made of the broken fibre applied to the bleeding surface, and retained there for a few moments will arrest it. When the hæmorrhage is from the bottom of the socket the styptic should be rolled into a firm tent as large as the cavity in the alveolus and long enough to fill it. Introduce the tent with a pair of pointed tweezers, and with a smooth blunt-pointed instrument force it down to the bottom of the cavity, and retain it there for a short time with a compress. With this substance properly used little difficulty will be found in arresting any hæmorrhage likely to occur from the extraction of teeth, with the advantage already referred to, of being tasteless and free from any other unpleasant effect. It does not stain or tarnish the instruments used in its application, an objection to which all other styptics are liable. E.

FILLING TEETH.

The capital operation among those that the dentist is called upon to perform is undoubtedly that of filling a tooth.

It may require considerable nerve and an accurate knowledge of the anatomical relations of the various organs and tissues of the face, as well as considerable manipulative ability to be able to excise the superior maxillary bones, or disarticulate the inferior maxilla, or to perform many other operations upon the mouth and face; but no operation in oral surgery is attended with so many difficulties, or requires so much manipulative skill, or a more accurate knowledge of the relation of parts, than these operations upon the teeth that the dental practitioner is daily called upon to perform.

It is true that the danger attending many of the more important surgical operations lends a fearful interest to them that does not attach itself to the common operations upon the dental organs, but the difficulties to be overcome in the latter class of operations are certainly greater than in the former.

I doubt not but that many practitioners of medicine and surgery would deem this proposition untenable, but if it be passed upon only by those who are practically acquainted with both classes of operations I have no fears that its truth will be disputed. It will be readily conceded by all competent practitioners, that the most skilful and experienced can only approximate a perfect operation in some locations and under certain circumstances, and that abundant room for investigation and improvement still remains in that direction.

We frequently meet, however, with practitioners who seem to be perfectly satisfied with themselves in this respect, but it is scarcely necessary to remark that these self-satisfied gentlemen are almost invariably of that class whose operations are for the most part perfectly worthless, and who are themselves a disgrace to the profession to which they claim to belong. I have never yet met with a good operator who was not anxious to learn more about plugging teeth. Although I should be most happy, were

it in my power, to gratify those who are far advanced in the literary acquirements of the profession, and skilled in the manipulative expedients of the dental art, by contributing something that would interest them; still I shall in this article only attempt to bring out some points in practice with which they are doubtless already familiar, but which I hope may be of some service to young practitioners, and to those that have not had the opportunities enjoyed by their more favored brethren.

In the first place it is well to remember that to plug a tooth in such a manner that the filling will not fall out in a few years, is a simple operation compared with filling one in such manner that it will completely protect the tooth, so far as that individual cavity is concerned, from farther decay. In relation to that species of failure in this operation in which the plug falls out of the cavity, or is picked out by picking the teeth with a toothpick, or is forced out by using the tooth in mastication, I wish to make a few plain statements:

Mouths very frequently come under my observation in which a half dozen or more plugs have been inserted by some operators, and three or four, and in some cases nearly all of them have fallen out in a few months after the teeth were filled. Now if this should meet the eye of any one who is so unfortunate in his operations—I will not say *so* unfortunate, but I will say unfortunate enough to lose one in twenty of his plugs in this way (for I design to keep far inside of what a first class operator will do) —I want to say to such a practitioner that he must not soothe his conscience by forcing himself to conclude that others, who are really respectable practitioners, are in the same category. He may know of some of his brother practitioners who are as unfortunate as himself in their operations, but it will be fortunate for him, and still more fortunate for his patients, if, after having his attention directed to these facts, he takes the necessary steps to learn how to put in plugs that will not fall out under any ordinary provocation. Not only must a plug be put in so that it will not fall out, but it can and must be put in so that as a general thing the patient cannot remove it at all.

If a patient remarks, as I have many times heard them, after

having had their teeth filled, that he would be careful not to pick out the fillings whilst picking his teeth, I invariably inform him that if he can pick out any of my fillings in that way that it will be because I have failed to perform a good operation, and that the responsibility for loss of the same will rest entirely upon my shoulders.

Be assured once for all, you can learn to put in plugs that will not fall out if you are not able already to do so.

Upon the supposition that there are some who might be benefited by an examination of this subject, I will, in the next number, state some of the points to which attention must be directed to guard against this kind of failure in an operation. J.

(To be Continued.)

GOLD COFFER DAM.

HENRY S. CHASE, M.D., D.D.S.,
Assistant Editor Missouri Dental Journal,

DEAR SIR: In the last number of your Journal [Feb. No.] I find an article headed "Gold Coffer Dam," describing an article of my own invention (which I took great pleasure in showing you some months since).

Fearing that your readers may misconstrue your article into claiming the above as your *own invention*

I ask you, as a simple act of justice to myself, that you give "Honor to whom honor is due" in the next number of your journal.

Truly yours,

Feb. 8, 1869. EDW. G. HALE, JR., D.D.S.

REMARKS.—In recommending modes of OPERATING I do not pretend to give names of authors.

From whom I received the idea of the "Gold Coffer Dam" I do not know; certainly not from Dr. Hale, as I had made use of it before my interview with him.

By referring to the article alluded to by Dr. Hale it will be seen that I made no pretension as the inventor of the "Dam."

I have met with many dentists who state that they use gold rings for this purpose. C.

Mechanical and Miscellaneous Department.

REFITTING TEMPORARY RUBBER PLATES.

By ———

Temporary rubber plates which have been placed in the mouth immediately after the extraction of the teeth, in many cases, from the great change occurring in the form of the mouth, the result of absorption, soon become a source of trouble to both patient and operator. This difficulty may be very speedily met by taking a new impression, from which take a plaster model. With the aid of a small bur remove the entire palatine surface of the plate to the depth of half a line, increasing the depth a little over the rugæ of the central portion of the palate. Place the case upon the model and wax up the edges to prevent any plaster passing between it and the model in flasking; place it in the flask, separate the flask, remove all wax, and cut out bits of surplus rubber. From a sheet of rubber cut a piece nearly large enough to cover the entire surface of the model, place it on the surface of the plate, and if there be any points where the absorption has been very great, add a little rubber at these points; close the flask and vulcanizer; when done take from the flask and polish the edges and the case is complete, the articulation being unchanged, if the process be properly conducted.

IMPRESSIONS FOR DIFFICULT CASES.

BY———

The following method of obtaining a correct impression in any difficult case when the usual means fail, was suggested by some member of the profession and we describe it with the hope it may prove as effectual in helping others out of a difficulty as it has us.

Take an impression with either plaster or wax, from which prepare a plaster model. Upon this model form a deep gutta-percha trial plate, which in this process is to serve the purpose of an im-

pression cup. A handle may be formed of a piece of wire, attaching it to the cup by heating the ends, and imbedding them in it while upon the model. Line the entire palatine surface of the cup with a thin layer of cotton. To attach the cotton to the cup a coat of mastic varnish should first be applied to the surface.

In an impression cup thus prepared place a *small* quantity of plaster mixed very thin, not so thin as is ordinarily used for impressions, carefully introduce it into the mouth and when in position sustain it steadily, with *little* or no pressure. When hard remove it carefully and proceed as in the usual methods. If the impression should be broken in removing it from the mouth, as will sometimes be the case when there are natural teeth remaining, the cotton with which the cup was lined, being incorporated with the plaster, holds the pieces together, and with little or no trouble they can be replaced in their proper position. From an impression taken in this manner, it being, as it were, flexible, two or more plaster moulds may be taken almost equally correct. By this method a correct impression is obtained of all the parts in their natural position, not being in the least displaced by pressure.

DISCUSSIONS IN THE MISSOURI STATE DENTAL ASSOCIATION

AT THE ANNUAL MEETING, JULY, 1868.

Reported by W. H. Eames, D.D.S., Recording Secretary.

DENTAL HYGIENE AND HYGIENIC TREATMENT OF CHILDREN.

Dr. Chase was satisfied of the fact, that the character of the teeth of the child is dependent upon the condition of the teeth of the mother during three important periods, viz.: conception, gestation and lactation. Any general or local disease that interferes with the proper assimilation of the food, or the functions of nutrition must have its effect upon the organism of the child. How important it is then that the health of the mother should be unimpaired during these periods, and also that her blood should be abundantly supplied with tooth material, especially phosphate of lime. If the necessary constituents are wanting in the blood of

the mother, it is evident that the process of calcification must be imperfect. It will be observed that in some children, grooves and furrows are seen in the teeth; this evinces an arrest of growth, which may be traced to sickness of mother or child. In other teeth, pits are seen in the enamel, caused by some severe constitutional disease, such as syphilis or scrofula. A certain amount of phosphate of lime is found in the urine; this is derived from the bones, teeth and softer tissues; now not only is the enciente mother obliged to make good the daily loss of phosphates in her own body, but also to supply the needs of her growing child.

Imperfect and diseased teeth of the mother, influence the quality of those of her child, even from the moment of conception, through gestation and lactation. This being true, we should pay particular attention to the condition of the mother's teeth during these periods, and see to it that no caries of the teeth is progressing; in short, that her teeth are in as good a state as intelligent dental skill can make them.

Now we, as Dentists, know that the teeth of enciente and nursing females are in most cases in a bad condition. It is our duty to account for this, and it is easily done. In many cases the mother feeling the strain upon her constitution from nursing or during gestation, has recourse to stimulants, a factitious assistance which is not nutritious; it is certainly the duty of the Dentist to point out this to his patient. In all *natural* food, especially in the cereals, will be found large quantities of phosphate of lime. But when, to please the public taste, the manufacturer of superfine flour robs the wheat grain of four-fifths of this phosphate, he is destroying the teeth of his customers. An adult woman requires fifty grains of phosphate of lime daily to keep her body in a normal condition, but when enciente she requires twenty-seven grains for the growth of her child, and ten for the daily loss: this would make eighty-seven grains per diem. If, as is the case with many ladies, her principal food should be superfine flour, it will be necessary for her to eat one hundred and fifty ounces to supply her body with the necessary lime salts; an absurd quantity, and one which no person could digest. On

the other hand, the same weight of phosphate is contained in *thirty* ounces of *unbolted* wheat flour. At present fine flour is a curse to the community.

Dr. Judd would almost as soon place a child of his in the hands of a nurse sick with measles, scarlatina or small-pox, as in the hands of one whose breath was laden with noxious exhalations emanating from a mouth filled with decayed teeth, ulcerating gums, and what is worse yet, masses of tartar, in and upon which myriads of animalcules live and propagate their kind and die. adding something during their metamorphoses to the filthy condition of the oral cavity. Although attention had been called to this subject before, still sufficient importance had not yet been attached to this subject.

One word more in relation to Dental Hygiene. Infants should have a daily sun bath—their bodies should be exposed naked to the sun several minutes each day. Its vivifying effects are wonderful. Animals as well as plants need them.

In answer to a question ; inclines to the opinion that the child's teeth may partake of the character of the nurse, even though not the mother. If a mother cannot supply good milk to her child a proper nurse should be obtained. She should be a perfectly healthy woman, without hereditary or latent constitutional disease; her own teeth should be perfect; should weigh 150 pounds and be able to supply 3 pounds of milk per day.

Answer to a question; If potatoes are desiccated and compared with desiccated wheat, the percentage of lime salts would be about the same in each.

Dr. Forbes said the subject of the employment of proper persons as nurses had not been overlooked by American Dentists. He was in the habit of enjoining it on his patients daily, and the dentists kept their patients so well advised on this subject that no nurse girl with an unhealthy mouth would find employment. It had been frequently asserted that the teeth of American ladies were shockingly inferior to those of their European sisters. This he emphatically denied; he wished it distinctly understood that this was not so, but the contrary was the fact. The impression may have arisen from the fact that every class of society in Amer-

ica feels the importance of having healthy mouths, and therefore a great number in every class of society pay some attention to their teeth, and are benefited by the advice and aid of the intelligent dentist. He spoke of the American and European women generally as to their physique, giving to the former a decided superiority over the latter, and as to the comparative pride they respectively took in the care of their teeth, and the appearance of their mouths, there was no comparison, for he had never been so disgusted, aye, that was the word, disgusted, as he was while abroad last summer, at the culpable indifference to the foul appearance of the teeth, and he was inclined to the opinion that the atmosphere as much as the diet was the cause of the excess of decayed teeth among the nations of Europe.

EDITORIAL.

RUBBER AND RUBBER PATENTS.

We have received several communications making enquiries respecting some of the recent dental patents, which are now being brought to the notice of the profession through the medium of our Journals and of circulars which are being distributed throughout the country. As this is a subject of special interest to our readers, we propose answering our correspondents through the JOURNAL.

Before giving our views respecting the patents in question, we offer a few thoughts suggested by these enquiries, respecting dental patents in general. One of the evils consequent upon the introduction of rubber, or other cheap material, as a base for artificial teeth, patent to all true lovers of the art of dentistry, has been the introduction into our ranks of a class of ignorant practitioners, who, from their utter want of knowledge of the science, and disregard of all rules governing professional men, disgrace our profession. The ease with which the manipulations in this and kindred substances are mastered, enables this class of men, without the expenditure of much time or money, to go forth on their swindling tours as travelling dentists—quacks of the worst sort.

Another result, directly traceable to the use of rubber, which we deprecate, is, these patents. If reference be made to the records for the source of many of these clap-traps, their origin will be found with a class of men possessing little or no professional ability—save, it may

be, in the manipulations of rubber—and having no professional pride; hence we often see old ideas and methods, long since discarded by the better class of operators, revived and patented as something new, for the sole purpose of making the almighty dollar. Such men should receive at our hands the same treatment the quack with his patent nostrums receives at the hands of the medical profession. We regret to see this class of men and their wares puffed into notice by laudatory communications over their own signatures, published (unwittingly, let us believe) in our Journals as solicited articles. Men who would blush at the thought of recommending some of these worthless humbugs, too often aid the patentee to dispose of his trash by allowing their names to be used in circulars and puffs in some connection, not directly recommending its adoption or use, but appreciating its merits. Most of us can point to some worthless patent instrument or process which we have been entrapped into buying by these same means. Our profession is thus being disgraced and swindled daily, and this evil is on the increase. It is time for the profession to wake up to a sense of duty upon this subject. If we desire the recognition and respect of that profession of which we claim to be a branch, we must not so far forget what they consider as properly belonging to the ethical code of the profession as to countenance in any way such impositions as the majority of dental patents. We hope soon to see our Journals taking the initiative. Let rubber, and all kindred base substances which have but the recommendation of cheapness and the little knowledge or skill required to manipulate them, be wiped from the list of materials as bases for artificial teeth, and the now broad avenues to our ranks for quacks will be closed.

In answer to the enquiries made of us respecting the patents of Drs. Goodall, Reynolds, and Stuck, we answer, we know little more of them than what we gather from our Journals and the circulars sent us. From these sources, however, we learn the fact that they all make use of rubber, and any one adopting either of them is amenable to the Rubber Company or to Dr. Newborough. Dr. Goodall's Patent Elastic, or Spring Plate, consists simply of a narrow rubber plate, say ¼ to ⅜ of an inch in width, so constructed as to fit closely the lingual surfaces of the teeth, with points filling the spaces between the necks of the bicuspids and molars. It should be well vulcanized in order to give it elasticity. To make the plate more secure, the author says 1-16th of an inch should be scraped off the lingual necks of the molars and bicuspids, on the plaster cast. To secure the points between the necks of the teeth fill the spaces on the model with wax before flasking. For incisors and

cuspid teeth the plate should extend to the distal surface of the anterior or molar; for the bicuspids, the plate should extend around the distal surface of the dens sapientia. The principle upon which this method is based is an old one being really nothing more than the old stay clasp plate. But rubber plates have been constructed in substantially this manner now more than two years, which renders the method unpatentable. I have patients now using plates made in this manner. I abandoned the use of it for the following reasons. The little points of rubber filling the spaces between the necks of the bicuspid and molar teeth, act as irritants to the margin of the gums, and as a result we have a recession of the soft parts, and a gradual wasting away of the processes; the teeth become loose and are finally lost. The patient complains of soreness about the necks of the teeth. This is not due as Dr. G. tells us to pressure, but is the result of chemical action. The retention of particles of food and mucus upon the surface of the plate in contact with the necks of the teeth produces this condition.

There are other objections which we might urge against this method, but we deem it unnecessary at this time. We consider a properly constructed clasp plate superior in every respect.

Dr. Reynolds' claim is for a mode of attaching plate teeth to rubber base by means of gold lining, soldered to the teeth and anchored to the rubber. This method has been in general use by the profession almost since the advent of rubber. The first teeth used for rubber work were plate teeth, and sets constructed in this manner were among the first specimens we saw on this base. It is something which suggests itself to any one at all skilled in the manipulations of the laboratory. The claim of originality has never, that we are aware been made till now. Having been in general use for a sufficient length of time it is therefore unpatentable.

For the opinion of others in regard to Dr. R's. claim, we refer our readers to the report of the proceedings of the Odontographic Society of Pa., before which body specimens of this style of work were recently presented and commented upon.

The process of Messrs. Stuck & Owen we had occasion to introduce to our readers in our first issue, since this however, we have received assurances from Messrs. S. & O. that their patent as improved and perfected, is not only practical but really of great value to the profession. We know nothing more definite respecting it than when we wrote.

We give in this connection a letter from Dr. Lewis upon this subject,

hoping soon to hear something of a more definite character concerning it:

Buffalo, N. Y., Jan. 30, 1869.

Dr. W. H. Eames:

Dear Sir:—In the January number of your journal, I notice reference is made to a new method of constructing rubber plates. Portions of the process claimed by Messrs. Stuck & Owen have been in use several years to my positive knowledge. A gentleman of this city has for ten years or more constructed metallic dies directly from plaster impressions, and with invariable success. Doubtless there are many others who have accomplished the same. The process of Messrs. S. & O. differs only in perforating the impression cup, and filling with sand to prevent blowing. The same result may be obtained by drying the impression slightly before pouring in the metal. The cast from a dried impression is far more perfect than that from a "green" impression.

The patent obtained by Messrs. S. & O. relates only to the perforated or slitted impression cup. The remaining portion of their process being unpatentable, and consequently common property. Below is a copy of their claim as patented Sept. 29, 1868:

82,563.—Method of obtaining Dental Models.—Levi Stuck, Bryan, Ohio:

I claim, 1st. The method of obtaining dental model-plates of metal directly from the mouth-impression, by casting the metal in a perforated or slitted mouth-impression, B, substantially as described.

2d. The employment of a slitted or perforated impression cup, C, substantially as described, in combination with a plaster-mouth-impression, B, vented through the raised surface, a, substantially as described.

3d. As a new article of manufacture, a metallic dental model-plate or die, A, when obtained in the manner substantially as herein described.

The method by which a polished lingual surface is given to a rubber plate, by means of pure tin foil or plate, as described by the article in question, was presented before the Western New York Dental Association, some six years ago, by Dr. Titus Brown, of Canada, and at that time attracted but little attention.

Yours truly,

Theodore G. Lewis.

BOOK REVIEW.

PHYSICIANS' MEDICAL COMPEND AND PHARMACEUTICAL FORMULÆ.

A neatly bound pocket volume with the above title, compiled by Edward H. Hance and published by Hance, Griffith & Co., of Philadelphia, is before us.

It contains "Formulæ for the preparation of Tinctures, Wines, Syrups, Infusions, Ointment, Plasters &c.," in accordance with the directions laid down by the U. S. Pharmacopœia, a lsoa list of the most useful articles described in works upon Materia Medica, with properties, doses, &c., with a department devoted to "Antidotes and treatment for Poison." It will prove a useful "Vade Mecum" for the practitioner, as it is so much easier to carry many of these articles in ones' pocket than in ones' brain. J.

The Missouri Dental Journal.

A MONTHLY RECORD OF THE SCIENCE.

VOL. I.] APRIL, 1869. [No. 4.

HISTOLOGY.

Histology, or the study of the tissues, is of comparatively modern origin, and owes its existence, so far as its morphological characteristics are concerned, to the use of the microscope in anatomical investigations. Its history extends only back to the seventeenth century. The first microscopic histological investigations, of which we have any record, were made by Marcellus Malpighi and Anton Van Leeuwenhœk, followed soon by Ruysch and Swammerdam, and during the next century by Muys, Lieberkühn, Fontana, Prachaska and others.

Two hundred years of laborious investigation sufficed to establish a sufficient number and variety of facts to warrant the attempt of Bichât, in the beginning of the nineteenth century, to collect, arrange and classify them in order to form the basis of a veritable science. The labors of Bichât were crowned with success, and the new science cultivated by Schleiden and Schwann and a host of others, stands at the present time second in importance and interest to none of the physical sciences.

It will not be denied but that pathology is the only true basis of therapeutics, or the "healing art;" whilst one of the foundation stones of pathology is pathological anatomy. A knowledge of pathological anatomy is necessarily preceded by a knowledge of the healthy structures; for how can it be possible to determine when morbid aberrations commence without first being

perfectly familiar with the characteristics of the normal tissues? Therefore it is reasonable to conclude that anatomy, and especially its microscopic department, lies at the foundation of all rational medicine.

Histology, which, according to Dunglison, is derived from the Greek *histos*, signifying "organic structure," and *logos*, "a description" may therefore properly be styled the science of tissues, or of organic formations. Most authors upon histology begin with a description of the so called elementary granules, vesicles, nuclei, &c., but as little is yet known of these "elements" which has heretofore been considered of any special service in histological investigations, they have for the most part considered the cell as the elementary morphological constituent of the various tissues, or as the form that matter first takes as it passes the threshold of the inorganic and enters the domain of the organic world. The cell has been described as a minute closed sac, and it has been generally admitted that cell contents and nucleus, together with the cell wall, were the essential characteristics of a true cell, although by many, vesicular formations, though wanting in nuclei, were not excluded from the cellular family. The definition of a cell, however, as described above seemed to be upon the point of being universally adopted, when it was again disturbed by certain observations which by militating against the general importance of the nucleus, seemed to argue against the absolute necessity of its existence in a true cell formation.

Agassiz whilst studying the natural history of turtles, had occasion to make extended microscopic observations upon the contents of the ovaries. He found the ova, or cells of the ovaries, of various sizes, the smallest of which he describes as appearing under the highest powers of the microscope only as homogeneous masses of matter, and in the course of their growth or development they appeared with cell wall and granular fluid contents, before any nucleus makes its appearance; and he describes the first appearance of the nucleus as a "hazy mass" close against the cell wall, and always developed in contact with the inner surface of the wall, but states that it is always freed from it soon after the perfecting of its outlines. He objects to the nomencla-

ture in general use among cytologists, because the word nucleus indicates the theory of a cell formation through a nuclear agency, when, in fact, the nucleus in many instances is developed after the cell is fully formed.

He then proposes to substitute for the words "cell wall, nucleus, and nucleolus" names which he considers free from these objections, viz: ectoblast, mesoblast and entoblast. Although these names seem to be admirably adapted to the end that they were intended to serve, as far as expressiveness is concerned, they have not as yet been adopted to any extent by the scientific world, as histologists were neither prone to accept a new nomenclature nor to accede to new histological doctrines put forth by one who although world-renowned as a writer upon natural history had given no previous evidence of a critical knowledge of microscopic anatomy. But when Lionel Beale promulgated his new doctrines relating to cytology and which coincide in some essential particulars with the observations recorded by Agassiz, the medical world was more disposed to give it a respectful consideration. Beale, whilst speaking of the cells, or as he designates them, the elementary parts, says, "there is reason to believe that independent living particles exist which are infinitely smaller than the smallest particle which can now be seen by the highest powers yet made, (1700 diameters)."

He not only finds cells without nuclei but declares that in many instances the elementary parts have no cell membrane, but thinks that the germinal matter of the elementary parts or cells are always made up of spheroidal atomic elements, and that the nuclei are endowed only with the potentiality of the germinal matter, and as nuclei are in a quiescent state, whilst if the surroundings are favorable it may become active, and even if the cell wall and cell contents, with the exception of the nucleus, should be destroyed, the latter might reproduce the entire elementary part or cell. It will be seen that in several particulars the innovations of Agassiz upon the old doctrines are sustained and corroborated by the observations of Beale. In the first place Beale admits that the nucleus makes its appearance in the cell after the cell is fully developed. Agassiz announces

the same fact. Agassiz declares that true cells exist so minute that they appear under a high magnifying power as the merest atoms of homogeneous matter. Beale asserts essentially the same of his elementary parts or cells, and ventures the supposition, as stated before, that masses of germinal matter exist which are endowed with the powers of unlimited growth which are infinitely too small to be seen with a magnifying power of 1700 diameters.

Had it been possible to establish exact and constant characteristics of the cell, as well as definitely to determine that it constituted the initiatory form of organized matter in all living beings, with an ever recurring succession of cell wall, granular contents and nucleus, our knowledge upon the subject would not have harmonized with all other observations made by man whilst investigating the laws of nature and attempting to unravel the mysteries which lie locked up in the penetralia of her secret laboratories.

It would not have harmonized with our investigations in all other directions, because we should have reached the limits of this inquiry and been able to definitely mark the line that separates the animate from the inanimate, and to describe with mathematical exactness the material elementary characteristics of all living beings at the very moment when they first manifest the phenomena of life; whilst in all other directions the solution of one question only opens a myriad of others for investigation. And, although our knowledge is somewhat extended by every advancing step, we are constantly reminded by the new questions that present themselves for solution of the infinitude of the unknown space that lies still before us.

With these facts before us how shall we describe a cell?

If we describe it as a minute closed vesicle or sac, with fluid contents, which is essentially the definition of Schleiden and Schwann, and of Carpenter and Dunglison, we fail to recognize the nucleus as an essential constituent. This is however maintained by Kölliker, as he says, "in the interior of cells are invariably found, at a certain time, one or more nuclei." Whilst Todd and Bowman go still farther and declare that the cell is

the simplest and most elementary form that we are acquainted with, and contains a nucleus and nucelolus. The presence of a nucleolus is however not generally considered as an essential constituent. Virchow remarks that the cell is really the ultimate morphological element in which there is any manifestation of life, and evidently regards the nucleus as an essential constituent of a true cell, as he says that we should not be able to say that the human blood corpuscles were cells if we did not know that there is a certain period during which these corpuscles have nuclei, viz: during the first months of intra-uterine life. Peaslee describes cells as consisting of five structural elements, the cell wall, contained fluid, granules floating in the fluid, nucleus and nucleolus. So far as the anatomical characteristics are concerned it seems to be generally conceded that a cell wall, contents, and nucleus will still be considered as constituting a true cell, and there would have been no danger of confounding the elementary parts of Beale and the minute homogeneous masses of Agassiz, both of which are capable of a true growth, but which have neither cell wall nor nucleus, with cellular formations, had it not been that they are shown to be endowed with powers and activities which were supposed to belong to the cell alone; but the opinions of Todd and Bowman, Virchow and others, who regard the cell as the simplest organic form that is capable of manifesting the phenomena of life, can no longer be maintained. Although the cell will probably retain its present definition of a closed sac containing granular contents and a nucleus, the advancing strides of scientific research have stript it of its crowning glory, as it can no longer be considered as the ultimate form which is endowed with the activities of animated existence.

We find therefore that the question, what is the ultimate form that matter takes when it first becomes capable of the manifestation of vital actions? is still far from being answered, and in this respect this question now stands in perfect harmony with all other scientific questions that have engaged the attention of man. The determination of the fact that the cell is not the ultimate form of living matter has at once opened a host of new

questions for solution. Will the spherical atoms of Beale arrogate to themselves the honors which the cell has so long enjoyed, but which it has now lost for ever; or shall we be admonished by the experience of the past to regard these minute spherules as organic masses, containing organs and systems and apparatuses as grand and imposing in the infinitude of their littleness as the mightiest creations of Omnipotence?

LEUCOCYTES.

From the St. Louis Medical and Surgical Journal.

The rôle which late researches in histology and experimental pathology are ascribing to the white elements of the blood is daily increasing in importance. Although the discoveries of Cohnheim,* or rather the views which he somewhat prematurely based upon them, have escaped criticism, the facts observed have not been refuted.† They have been followed, however, in a brief space of time, by two interesting observations of some other phenomena which must impress the unbiased reader strongly in favor of Cohnheim's position. We purpose to lay these observations before our readers in such extracts as our space may allow, and cast a glance backward at the important investigations that preceded and paved the way for new facts.

We will not go back farther than Von Recklinghausen's dis-

* We refer the reader to the St. Louis Medical & Surgical Journal. Vol. V, p. 117, 1868.

† Prof. Koloman Balogh, of Pesth, in Virchow's Archiv, xlv. p. 19, 1868, endeavors to refute Cohnheim's observations, aside from certain grounds of improbability he adduces by stating that *he*, in repeating the experiment on the mesentery of the frog, did not see the white blood corpuscles pass through the walls of veins. Nevertheless he did see the crowding of these bodies in the marginal zone of veins; he did also observe an increase of similar elements in the surrounding tissue, says they must result from division of the connective tissue corpuscles, but did not see this division actually occurring. The learned Professor has himself supplied the critique of his own argument.

covery, published in 1863,* that pus cells are contractile, that they possess the faculty of locomotion by virtue of their power to alter their form; and that these cells, by their contractility, are also enabled to take up and into their substance foreign bodies of small size (insoluble particles of various pigments, etc.). This discovery of contractility and the power of migration proved at once a forcible argument in favor of the identity of the cells of pus, lymph, mucus, and the white cells of the blood. Virchow, long ago, had shown that a morphological difference between the white blood cells and those of pus could not be detected. Moreover, the researches of Von Recklinghausen had resulted in demonstrating, that corpuscles of the same size and optical properties, also possessing contractility, exist in normal connective tissue. The importance of these investigations, both in themselves and as a starting-point of later studies in the same direction cannot be overrated. "There can hardly be a doubt," said Von Recklinghausen (p 189, l. c.) "that the contractility of these corpuscles is of considerable significance in the normal and pathological processes occurring in the connective tissue. As to the latter, direct observation shows that the pus corpuscles resulting from inflammatory irritation can migrate through very large tracts of tissue. It follows that, finding an increase of cells in any part of the tissue in consequence of proliferative processes, we may not at once suppose them to have originated at that precise spot. In ordinary suppuration, the pus corpuscles assuredly find their way to the free surface of the ulcer, and into the interior of the large canals and cavities of the body, in part at least, by means of the above contractile movements. But especially are their movements and their very considerable migrations . . . probably very influential in the so-called organization of fibrinous exudations, of blood extravasations and of thrombi."

In these words Von Recklinghausen foreshadowed the later observations to which we wish to advert. In the organization of thrombi, the important part of organizer has already been assigned

* Ueber Eiter- und Bindegewebskoerperchen. Virchow's Archiv, xxviii, p. 157.

to the leucocytes by Virchow, who believed that the white blood corpuscles enclosed in the clot of a tied vessel organized to form the elements of connective tissue. O. Weber, Billroth and others accepted this position, confirmed by observations of their own. "I confess," says Billroth,* "that I formerly myself strenuously objected to the assumption that the blood could of itself organize into connective tissue with vessels; but after the examination of transverse sections of thrombosed arteries I have become convinced of it. . . . Whence do these new formed cells come? I doubt not but that they arise from the white blood corpuscles. . . . . Moreover, that the cells carry with them the faculty of further development is obvious, from the fact that their nuclei, while the cells are in the blood current, divide, for we frequently find white blood cells with two, three, or four nuclei." Finally Lee and Beale† give it as their opinion that the "germinal matter" which initiates the organization of the clot (and of all organizable exudations) is intimately related to the white blood corpuscles.

The latest experiments on the same subject seem to modify the position a little. Dr. N. Bubnoff‡ of St. Petersburg, taking the precaution, like some recent observers before him, to spot the white cells of the blood by causing them to "swallow" vermillion, arrived at the following conclusions from four series of multitudinous experiments on the jugular veins of rabbits and dogs:

"1. The contractile cells which form outside of the vein, take up the pigment, creep into the wall of the vein, gradually penetrate it, and finally reach the interior of the vein and even the centre of the thrombus.

"2. The pigmented cells contained in the circulating blood creep into the thrombus from out of the vasa vasorum; it appears therefore that the white blood corpuscles in the free blood current may take part, to some extent, in the organization of the thrombus.

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* Allg. chirurg. Pathologie u. Therapie. (Lectures on General Surgical Pathology and Therapeutics.) 2d ed. Berlin, 1866, p. 122.

† On the repair of arteries and veins after injury. Med-chir. Transactions. L. p. 478, 1867.

‡ Ueber die Organisation des Thrombus. Virchow's Archiv. xliv. p. 162.

"3. The colorless blood corpuscles of the clot lose their power of locomotion and do not take part in the cell-formation of the organizing tissue.

"4. Cells which enter the vein from outside participate extensively in the organization of the thrombus. It is probable, then, that in the organizing process the chief mass of the cells is furnished by the layers of the vascular wall and the surrounding tissue."

(The author adds that Prof. Billroth has accepted this proposition, as may be seen from the last edition of his Gen. Surg. Pathology.)

This experimenter, therefore, seems to have satisfied himself that, in this phenomenon also, it is the wandering cells which play the important part of organizers, though he considers most of them as descendants of the connective tissue elements in the vicinity. At the same time he denies that the epithelium of the vessel is at all concerned in the process.

More valuable even than the above is the series of experiments by Dr. E. Aufrecht,‡ originally instituted with a view to determine the question of the new-formation of striated muscle, but resulting in most surprising revelations concerning the genesis of connective tissue, and the healing of wounds by first intention.

"The experiments performed on rabbits and guinea pigs consisted in the infliction of wounds on the skin of the back, the glutæi and erectores spinæ muscles, as well as penetrating wounds of the abdomen. In wounding the dorsal muscles, the incision through the skin was so made as not to correspond to the incision in the muscle. The number of animals sacrificed was 18 for the first two days, 3 or 4 for each of the following days to the twentieth, a less number for the alterations taking place up to the fiftieth day. All but one of these wounds healed by first intention.

"Five hours after the injury, the several parts of the dorsal or glutæal muscles were re-united by a translucent mass containing but very few red blood corpuscles, which mostly lay near

‡ Virchow's Archiv, xliv, p. 180, 1868.

the cut surfaces of the tissues. The microscope showed this mass to be a uniformly clear substance, with straight or wavy lines mostly in parallel directions. In physical and chemical properties, the mass corresponds exactly to blood-fibrine. This fibrine, however, does not originate in the blood effused into the space of the wound, but makes its appearance only after the hæmorrhage has completely ceased.

"Imbedded in the fibrine are cellular elements which, until the 36th or 48th hour, steadily increase in number, and correspond in size and form to the white corpuscles of the blood. The question naturally arose, 'in view of the certain—(because obtained on the basis of the most exact method)—observations of Cohnheim on the passage of white blood corpuscles out of the vessels of inflamed parts,' if white blood cells had not in this case escaped from the vessels. The experiment of feeding with pigment by injection of vermillion or aniline blue was accordingly tried in frogs whose gastrocnemii had been cut out subcutaneously, and after eight hours the operator found pigmented cells in the wound; so that it was safe to assume, that white blood corpuscles, which leaves the vessels after the hæmorrhage has ceased, help to constitute the contents of the wound.

"This is not the only evidence, however, of the origin of these elements from the blood vessels, of their identity with white corpuscles; it can be proved by the exclusion of all participation of the connective tissue cells. The connective tissue fibres on the borders of wounds are found in the first days intact, the cells unaltered in form, and in the same regular disposition as normally.

"The first phenomenon observed in such wounds, then, is the appearance of fibrine and white blood corpuscles. At first the fibrine predominates, gradually the leucocytes immigrate into it, and after 48 hours already exceed the fibrine in bulk. All subsequent changes visible in wounds concern the leucocytes; at the same time the author is unable to disprove farther participation of the connective tissue cells, because they can now no longer be seen, being concealed by the constantly increasing number of the white blood cells.

"About 36 or 48 hours after the infliction of the muscular wound, there are found among the leucocytes roundish cells, each with a broad margin of protoplasma and light round nucleus without nucleolus, which up to the 4th or 5th day continue to increase in number, and almost completely replace the leucocytes. In size they exceed the latter considerably, their nuclei being almost equal to these. Between them is found a wholly amorphous clear substance in which they are imbedded.

"Later, about the 6th day of a muscular wound, the round cells are seen but sparingly; their places are filled with spindle-shaped cells, lying together in close rows, and increasing in size up to the 9th day. The nuclei also have changed their form, having become elongated. Between them are narrow strips of an inter-cellular substance which corresponds, in its relations with the cells, with the fibrine previously seen, as well as to the inter-cellular substance of the mature connective tissue.

"The question now arises: do the spindle-shaped cells originate, by the transitional shape of round cells, from the white blood corpuscles? and do the latter accomplish, as in the organization of the vascular thrombus, the new formation of the connective tissue? The author answers that the white blood corpuscles are the only cellular elements in the "contents of the wound;" surely it is not plausible that they should travel back again and be replaced by entirely new comers.

"The appearance of spindle-shaped cells in wounds is a long known fact. Paget asserts two methods of healing by first intention, one by means of cells, the other by means of free nuclei. But free nuclei, the author thinks he can state with certainty, never do occur. The same holds good of other objects illustrating the new-formation of connective tissue, as pleuritic and peritonitic exudations; the formation of connective tissue takes place only by means of cells."

The very valuable paper of part of which we have here given a brief résumé, continues to follow up the process of healing by the first intention, discusses the genesis of connective tissue in the light of former experiences and theories, and finally turns to the new-formation of muscular fibres. But our first interest in the

paper was directed to the support it gives to the discoveries of Cohnheim, and the functions and fate of the leucocytes; and the length of our present article forbids our following the author in his farther disclosures of the healing process, to which we may revert on a future occasion.

In view of all these facts, presented to us by competent observers, and partly verified by other most reliable authorities,* we see no reason to disbelieve that, under certain circumstances, the white corpuscles of the blood can escape from the blood vessels, migrate through the tissues, and on the one hand, perish as pus corpuscles, or finding their way into "coagulable lymph," organize into elements of the connective tissue type, and substitute living and vascular tissue for the fibrine thrown out in wounds, or serous sacs;—that the cellular elements of pus and mucus, and the migratory cells of healthy areolar tissue, have all, at one time, probably been circulating in the blood or lymph as "leucocytes."

PHYSIOLOGY AND PATHOLOGY,

THEIR CORRELATION.

Physiology is a description of those processes and functions of the several organs of the body which are necessary for its health or natural condition.

Therefore, All those processes may be called physiological which take place at the same time and location at which it is desirable that they should.

Pathology is a description of all those processes and functions of the body which take place at such time and in such places as are undesirable, and thereby interfere with the life, health and comfort of the individual, and,

Therefore, It is proper to say that all those natural and physiological processes and functions which take place at such times and in such locations as are undesirable are thus far pathological.

* Among others, we may name Dr. Bastian.

Thus it may be known that it is often extremely difficult to draw the division line between that which is really pathological and that which is physiological.

The production of fat is certainly a physiological process, and it only becomes otherwise when it has accumulated to such a degree that it interferes with the function of some organ or is burdensome to the individual from its own weight. The heart may become so laden with fat as to interfere with its contractions —and so indeed may the voluntary muscles.

The presence of the elements of bile in the blood is physiological; but when from inaction of the liver they accumulate beyond its necessities they then poison the brain.

The production of bone is physiological, but when produced in the bursæ of the joints, the substance or meninges of the brain, at the roots of the teeth, the foramen of the inferior maxillary nerve, and the tricuspid valves, &c., &c., it becomes pathological.

The aqueous exudation from the skin, or perspiration, is a healthy and natural process, but the excessive sweats of intermittent fevers are very exhaustive.

When secondary dentine forms in the pulp cavity, to block the progress of caries in the tooth, it is physiological. When calcification of the pulp takes place in a tooth whose crown is worn down so as to expose the pulp to painful thermal changes, that process is also physiological. But when the same process occurs in a tooth unabraded and undecayed it is pathological.

And thus we might go on from organ to organ and from function to function and see the same relation obtaining between pathology and physiology.

It is important, then, to have a definite idea in the mind when we speak of physiological and pathological processes. C.

Operative and Surgical Dentistry.

VITAL PRESERVATION OF THE DENTAL PULP AFTER DENUDATION.

Read before the Iowa State Dental Society, in 1868, by HENRY S. CHASE, St. Louis.

The anxiety for the preservation of the health and life of the dental pulp after being exposed to the air and other irritating agents, by dental decay or otherwise, has manifested itself throughout the profession for many years.

Probably efforts in this direction were made in the infancy of *our art* with more or less success.

At the commencement of my professional life, in 1843, devitalization of the pulp with arsenic was just coming into practice, with considerable success. And as it was found to be more successful than the average of experiments for the preservation of its life in a healthy condition, it soon became the fashion to "kill the nerve."

Notwithstanding the satisfaction which this operation has given the public and the profession for these many years, there have been many who have felt that they were far below their ideal of a perfect operation. If surgical art should be conservative, and endeavor to preserve every organ in its anatomical perfection as far as possible, so that its physiological functions should be in harmony with the intention of nature, then surely it is our duty to preserve the anatomical form and the vital functions of the dental pulp in every case where it is possible so to do.

Let us briefly review the location of this delicate organ, upon which the health of the tooth is so dependent. In the molars and bicuspids it is situated in the central portion of the *neck* of the tooth, sending prolongations towards the cusps and tubercles,

and often penetrating them nearly to their points, beneath the enamel.

This is quite common in very young persons, and it is not at all unusual in the middle aged. Processes also extend through the whole length of the root canals, of considerable diameter in the palatal root of the molars, and usually hair like in size in the buccal roots of the latter, and in the canals of the bicuspids. The pulp of the canines and incisors occupies the root canal, coming up to the neck and often far into the crown towards its cutting edge. The pulp is a cellulo-fibrous body, permeated with anastomosing blood-vessels and nerve-filaments. Connective tissue is that which of which the great bulk of this body is made up. There are plenty of nuclei in these cells. This tissue is easily reproduced when partially destroyed. In fact it is the cicatrixal tissue of nearly all wounds.

The practice of capping over fleshy exposed pulps previous to plugging has been practiced for a long time with more or less success. Still it has been far from universal, and has been much less in vogue for the last four or five years than formerly.

The horns of the pulp are often so threadlike in size that they are exposed without the knowledge of the operator or patient, and plugs are inserted which frequently have to be removed on account of subsequent *pulpitis*.

The delicate tissue of the pulp does not bear at all well the contact of a good conductor of heat. Irritation, and subsequent inflammation are very sure to ensue if metallic plugs are placed in contact with it.

The most simple case of exposure of the pulp, is that of one of the horns laid bare by excavation preparatory to plugging. A little tannin or kreosote should be immediately applied, and the cavity of decay prepared for the plug; then the tooth should be plugged with Hill's stopping and allowed thus to remain three, six or twelve months, according to the extent of pulp denudation. Time should be given, if possible, for calcification to take place. If the plug needs *partial* renewal on account of wearing away, it should be attended to, but on no account re-expose the pulp. If permanent plugging seems to be demanded, it may be

done, but a sufficient quantity of the temporary plug should be left in the cavity to protect the pulp. In some favorable cases the judgment of the operator may decide him to cap and plug immediately. I think that the temporary plug is seldom pressed against the pulp so as to require removal. I have always used this kind of stopping, and find it so desirable that I have no wish to make experiments in this particular class of cases with osteoplastic. The latter substance is always used by some good operators, and their success doubtless warrants them in this course. And here let me say that it is folly to urge one unvarying line of practice for all dentists. One may be as successful as another in his own way; whereas, if he should adopt his neighbor's mode he would fail utterly.

If pulpitis should follow this operation, it must *immediately* be attended to, therefore the patient must be cautioned to return on any symptoms of pain being felt, otherwise the case may end in pulp death and peri-cementitis.

The treatment of an exposed, inflamed and suppurating pulp is quite a different affair from the foregoing. And if you expect me to give you any favorable personal experience in preserving it intact and in health, you will be disappointed. You all know what Dr. Atkinson says about this. He subdues the inflammation, and then plugs with osteoplastic in immediate contact with the pulp. He pronounces his experience favorable, and so do some others. I hope that I may learn at this meeting that members of this society have had equal success. I have not yet had an opportunity to try it since his report in the *Cosmos*. If the dental pulp will respond to the treatment, as detailed by Atkinson and Shepard, I shall be glad to experience it, for it is contrary to all my preconceived opinions.

It is claimed to be far more favorable in its results than pulp removal.

It will take two or three years to prove this. Within a few months I have seen several teeth with *dead* pulps treated with osteoplastic for preserving their lives. I shall not cease entirely to devitalize and remove pulps, until I find by experiment

that the new way is quite as successful in its *immediate* results as the old way.

We must make some allowance for reports of VITAL PULP TREATMENT with osteoplastic fillings. They are porous and allow gases to escape with great facility. Now a pulp may die, become disorganized, and give no trouble to the patient beyond a slight pericementitis, because the gases have exit through the pores of the filling. And for this reason, osteoplastic is not a reliable trial plug in cases of disorganized pulp.

TOOTH-ACHE DURING PREGNANCY.

By WM. O. KULP, D.D.S.

This malady is almost universally prevalent among American ladies, and the dentist is often consulted by the sufferer, and ought to be able to afford relief. Nature provides that during pregnancy and lactation the offspring shall be supplied with the bone, muscle, and nerve producing materials, even though the mother is robbed of her proper share of these elements. When there is not a sufficient quantity of the above elements in food taken by the mother, the following symptoms appear: first, an almost entire absence of phosphate or carbonate of lime in the mother's saliva, consequent burning sensation of the mouth, œsophagus and stomach—termed "heart-burn;"—almost simultaneously with the above, extreme sensitiveness of the teeth to thermal changes, also to the approach of salts, acids, &c., &c., and in a very short time, if not arrested, decay of teeth; and upon examination of decayed dentine, it will be found almost wholly void of its earthy matter; also systemic symptoms appear, viz: diarrhœa in both mother and child, anæmia, stomatitis materna, and finally death.

The most natural mode of cure would be to give the proper diet, and the cure would be spontaneous, yet in the later stages this seems to be not wholly practicable, as the power of assimi-

lating food seems to be too much impaired. When this is the case I find the hypophosphites very useful—given in ½ to 2 grain doses three times a day. As soon as relief comes, then depend mainly on the physiological mode of perfecting the cure.

I am now treating several very bad cases in the above manner, and am gratified to see rapid changes for the better.

Muscatine, Iowa.

HOW TO KEEP CAVITIES DRY.

[To Students and Young Practitioners.]

The principal difficulty in plugging a decayed tooth is in keeping the cavity dry, and the gold also as the operation progresses.

For the insertion of gold much time is often required, sometimes an hour or two, or even more. Now all that is required by skilful operators to perfect a plug is patience and a dry mouth.

A moderate use of napkins is well, but stuffing the mouth full of napkins is very disagreeable to the patient, and often a great annoyance to the dentist, obscuring his view of the point of operations and taking up room needed for the manipulation of his instruments. Napkins when wet are not easily removed from the mouth without danger to the plug ,and dry ones are not easily replaced.

Napkins being white do not show distinctly that they are wet, neither does bibulous paper.

Barnum's Rubber Dam, when properly placed on a tooth and secured, is an effectual protection against all moisture, and is invaluable and indispensable in many cases; but I do not intend to speak of the mode of using the rubber at this time, but of

Spunk.—This is far more useful than rubber dam because available in nearly all cases, being easily applied by every one without loss of time.

It is a great absorbent, being superior to anything I know of which is adapted to dental purposes.

It is soft and velvety, pleasant to the skin on pressure, easily

cut into any shape, and shows by its discoloration when wet, just how far moisture has approached the cavity to be plugged.

It should be used in small pieces, so that any piece when wet can be easily thrown out of the mouth, and replaced by a dry one. I use them in strips, squares and triangles. Strips one-eighth to one-half an inch in width, and an inch long. Squares of one-quarter, half, and inch pieces. The latter for the purpose of placing over the parotid duct to be held by the finger, or the pressure of the cheek against molar teeth. Triangular pieces one-eighth of an inch sides to place over the apices of the gums near the tooth being operated upon. A solid U shaped piece is used under the tongue to cover the ducts in that region. The rounded portion of the U is placed next the the incisor teeth. The straight edge of the U is slit up towards the curved border so as to accommodate the frænum of the tongue.

I will suppose that I have a very wet mouth to deal with, and an approximal cavity to plug on the posterior surface of the left under second molar. I have prepared the cavity: it is ready to plug: and I now prepare the mouth against moisture.

A clean napkin, half a yard square, is already fastened about the neck of the patient to protect the clothing. Another similar one is many times folded and placed upon the right shoulder to absorb saliva that may run from the mouth. The U shaped bit of spunk is adapted to the under side of the tongue; a napkin three by eight inches is folded lengthwise twice and one end turned over an inch, and the latter portion placed upon the tongue over that portion which has spunk beneath it. "Smith's tongue holder" is now put in proper position and the upper surface of the tongue brought below the cavity to be plugged. No spunk or napkins on the *right* side of the mouth. The parotid gland may empty itself on the folded napkin on the right shoulder. Napkins or spunk on the right side would draw the left commissure of the mouth more or less forward, and thus obstruct to a certain extent my view of the tooth plugged, and also interfere more or less with the use of instruments. I now place an inch square piece of spunk between the cheeks and the upper molar teeth, thus covering the left parotid duct. If I stand behind

and above the patient to plug the tooth I use the fore finger of my left hand to keep the spunk in place and draw back the cheek. If I stand on the right side and partly in front of the patient an assistant uses an instrument, and keeps the spunk in place, and retracts the cheek. Quarter inch strips are placed between the teeth and lips and cheeks from the central incisor around to the third molar. Two or three small strips are placed on the lingual side of the under molars and bicuspids, and one piece drawn between the left fork of the tongue holder and the adjoining tooth to be plugged. When the pieces of spunk lying against the tooth to be filled are wet half way up they are thrown out and replaced by dry ones. I allow other pieces to become saturated with saliva before removing them. A triangular piece is placed on the festoon of the gum between the teeth operated upon, the point being allowed to project into the space as far as convenient.

In many mouths none of the spunk would have to be exchanged, in others all the pieces, one after another, would be exchanged, once, and maybe twice. The piece most difficult to remove, (over the parotid duct) seldom need be exchanged, or once at most.

Although it takes a long time to describe this process, yet one minute is long enough to place all the pieces of spunk after they are ready cut. A quantity should always be ready cut and kept in a drawer or box, and a sufficient quantity to meet all the demands of the case should be upon the operating tray or within easy reach. The piece under the tongue is never changed.

The mouth is thus kept dry, the saliva never accumulates in it as it must do with the napkins. The feeling of choking which some patients have when the mouth is stuffed is avoided. Although the rubber dam when properly applied affords perfect protection from saliva, yet it is often in the way of vision and instruments. I have acknowledged that the rubber is indispensable in many cases, but I consider the spunk far more useful, because it can so generally be brought into requisition with more ease to the operator. C.

PLUGGING TEETH.—HAND PRESSURE.

The introduction of the mallet in operations on the teeth was a grand progressive step in the history of dentistry. The use of it has enabled us to perform operations that before were considered impossible. In judicious hands it is an almost indispensable instrument.

Its claims are so generally acknowledged that I need not argue the point. Indeed it has become so *fashionable* that there is danger in its popularity. Many dentists never plug a tooth or attempt to condense gold in the teeth without it. Some who have not much confidence in their own ability dare not acknowledge that they ever dispense with it, for fear that their reputations would be injured.

This is carrying *fashion* too far in our profession. The truth is that many cavities can be better plugged by hand pressure than by mallet force.

There are many cases constantly appearing in my practice where valuable tooth substance would have to be sacrificed, should I insist on mallet force for condensation.

The same location is not as approachable in one mouth as it is in another. It is easier to plug the posterior approximal cavity of a second molar in one mouth, than the posterior approximal cavity of a second bicuspid in another mouth. It is true that we may approach all cavities by a greater or less destruction of tooth substance. We may open the grinding surfaces of the teeth to get at the posterior approximal cavities. But I contend that this should not be done unless the grinding surface is too weak to bear mastication after it is supported by a good gold plug. Even in many cavities of easy approach mallet force is inadmissible.

I often wish to drive the gold in such a direction that could not be accomplished by the mallet. I often have occasion to plug the posterior and buccal surfaces of the wisdom teeth near the gums. This I have no particular difficulty in doing by *hand* pressure.

There are many *frail* teeth, which are much safer plugged by hand pressure than mallet force.

Even when I use the latter for condensation in an approachable cavity I often find it very convenient to use more or less hand pressure. I think every dentist should have instruments *particularly* adapted to hand pressure, as well as those adapted to mallet force. Mallet force is always in the direction of the shaft of the instrument, and however much curved the portion near the end is, one need not flatter himself that the direction of the force will be changed on account of the shape of the instrument.

There are many young practitioners who have acquired their profession since the mallet came into use, who have no practical knowledge of *hand pressure* instruments. It is for them particularly that I now write.

In innumerable cases they will find the hand pressure the most convenient, and the most useful. One of the most important points in a good plug is solidity. With delicate hand instruments you can force your pellets into places that would remain unfilled by mallet pluggers. "Rat holes" are to be avoided in forming a plug. One may form them very easily with any instrument by carelessness. But by mallet force I believe there are ten made where there is one by hand pressure.

The time occupied in making a good plug by hand pressure is rather more than by mallet force, *provided* you have a good malleter.

You do not have to wait an instant for your force in hand pressure; you can make pressures as quickly as you choose. Smaller masses of gold must be used by the latter method than by the former. More gold can be condensed by a single pressure by the mallet than by the hand. But the rapidity of your pressures is greater by hand than by mallet. Small points should be used in hand pressure, as small as will carry the gold before them; if the points cut through, either your point is too small, or your gold too massive.

As I have before said, the mallet in many cases is indispensable. So I say of hand pressure, in many cases it is indispensable.

For the building up of plugs that are to be used for mastication the greatest possible solidity is of course desirable, and mallet force is the most efficient means to accomplish this desirable end. But in cavities whose plugs are not required to bear any force, this great solidity is not necessary. As I have already said vacant spaces or "rat holes" in plugs should by all means be avoided, but the specific gravity of a gold plug need not to be as great in some cavities as in others. The specific gravity of a plug in the lateral surface of an incisor need not be as great as that of a gold "*cusp*," or that in the grinding surface of a molar. Gold is a great conductor of heat, and the more solid a plug is, the more danger of PULPITIS from thermal changes. The old fashioned plugs made of soft foil had less specific gravity than those impacted with adhesive foil and the mallet, and yet the durability of those plugs cannot be surpassed by the manipulations of the present day.

I have large soft foil plugs in the lateral surfaces of my central incisors, placed there twenty-two years ago. I have lately seen plugs of my own making, which are twenty-five years old. A certain amount of density is highly necessary to form a good plug, but the greatest possible density is *not* necessary or even desirable.

To young practioners I would say: endeavor to make a plug of *uniform density*, throughout; and have *perfect margins*.

C.

TANNIC ACID AND IRON.

Tannic acid and oxide of iron are used in the manufacture of black ink.

Sometimes these two substances meet in a tooth and forming a black ink discolor the dentine instantly.

Suppose a steel broach to be broken off in the root canal, it would oxidize in a few hours, especially if means had been used to oxidize it for the purpose of reducing its size for its more easy removal from the pulp canal. If tannic acid is employed to saturate the canal as part of the preparatory treatment of plugging,

it will be very certain to discolor the tooth, by forming a black fluid which will penetrate every tubulus in a few moments. If the whole surface of the cavity is varnished with sandarach, the tubes will be closed by it, and the ink will not enter them. Until the broken broach or other steel instrument is removed, then, it will be better to avoid the use of tannin, substituting therefor kreosote. Sometimes, however, we have the treatment of a pulpless tooth, in which a steel broach has been left by another operator, without our knowledge, and then we are taken by surprise at the sudden manufacture of ink. C.

FILLING TEETH.

Continued from March Number.

In the first place get fairly at the cavity that you propose to fill, wherever it may be located, and do this at all times and under all circumstances, without regard to the amount of labor required or the time consumed in the operation. Now one of the first requisites in order to accomplish this is to provide yourself with the necessary instruments, so that you can operate to the very best advantage. No man can perform creditable operations without good instruments and a good variety of them, and remember that with good drills and excavators, if properly shaped and tempered, you can always cut a cavity into just such shape as you desire it, however dense the tooth may be, if the hardness of the tooth is the only obstacle to be overcome. So if your excavator will not cut easily the hardest dentine, the instrument is either not made of good steel, or it is not well tempered or has perhaps been injured by heating too hot whilst working it. But how shall we get at cavities in the various localities in which we find them? In the first place, the approximal cavities of the incisor teeth may give us some trouble. We will suppose that the mesial surfaces of the superior central incisors are decayed, that the cavities are large, and the margins of the cavities are thin and ragged or notched by portions already having been broken off; and as a general thing the lingual wall will be broken off much more than the labial. In such a case it is probable that

filing or chiseling off the margins sufficiently to give them the requisite smoothness and strength will suffice to give you an abundance of room to operate, whilst shaping the cavity and filling it.

But suppose the labial margins are thick and strong, and the lingual margins alone are thin, ragged or notched, or perhaps considerably broken off. Then the cavity may be reached wholly from the lingual surface, the labial surface only being smoothed so that the adaptation of the gold to the wall of the cavity at its margin may be complete.

In either of these cases, if sufficient room is not gained by filing down the margins so that they are sufficiently strong, the wedge will usually make up the deficiencies.

But suppose again that the approximal surfaces are broad, that the cavity is small, and that both labial and lingual margins of the cavity are thick and the teeth stand closely together. In this case the teeth should be separated, if possible, sufficiently from one another to enable an operator to work between them. The question arises How shall this separation be effected? Two methods present themselves, each of which has its advocates, and by either method the object may generally be attained:

First, By driving wedges between the teeth, or,

Second, By using rubber or other material which will gradually bring about the separation required.

If the teeth are not very closely packed in the jaw, and especially if they are not very firmly fixed in their sockets, the separation will generally be best brought about by wedging. If this method is to be used I prefer a hickory wedge to any other that I have used; the pivot wood that we find at the dental depots answers the purpose very well, in fact much of it is better for this purpose than for any other.

As a general thing, if much space is required it will be judicious to use two wedges, one near the neck and the other near the cutting edge of the teeth, first tapping one and then the other with a small mallet; then wait a few minutes, and repeat the operation until a sufficient amount of space is obtained to enable one to properly fill the cavity or cavities between the teeth.

Care should at all times be taken not to use too much force, or much injury may be done to the teeth and surrounding parts by lighting up an inflammatory action; remembering always that whilst working upon the living organs every precaution should be taken to guard against lasting injuries, as well as to cause as little present pain to the patient as possible; without sacrificing, however, anything which will militate against the final success of the operation.

Too much force should not, therefore, be used in wedging apart the teeth, as I have seen cases where inflammation arising from this cause had not been entirely subdued after many months of treatment; and especially is this care necessary in regard to separating the superior central incisors, as the maxillary bones have been separated at their line of junction with each other, in extreme cases, and serious consequences have been observed as the necessary result. But if the wedging is carefully, slowly and judiciously done, in many cases the desired result will be safely attained.

Cases will arise, however, in which the teeth move with great difficulty. Cases in which the teeth not only stand strongly and firmly in their sockets, but in which there is a crowded denture, and the application of a sufficient amount of force to separate them widely enough to enable one to operate between them with facility would be entirely impracticable. We must reach the cavities in some other way. This may be brought about by forcing rubber between the teeth, and, if necessary, repeating the process every day or every few days, each time using a larger piece of rubber until sufficient space is gained for the purpose of operating. But this method, though practiced by many good operators, is not free from all objections. In the first place it is usually attended with more or less soreness of the teeth, which is not only troublesome to the patient but necessitates a delay, even after the teeth are sufficiently separated, until the soreness shall have passed away before one can proceed to excavate and fill the cavities. If, however, a more expeditious method of proceeding is decided upon it will either be necessary to separate the teeth with the file, always making the opening much wider upon the

lingual than the labial surface, and operating from the lingual surface, or one may reach the small cavity of decay by drilling to it from the lingual surface in such manner as to be able to excavate and fill it through the artificial opening which will then, as a matter of course, form a part of the cavity and be filled at the same time.

GLEANINGS FROM ACTUAL PRACTICE.

By F. A. Brewer.

Arsenic—Young Men Beware.—Of late two cases came under my observation and treatment, where a portion of the alveolar process was destroyed by the indiscriminate administration of arsenic while endeavoring to devitalize the dental pulps.

Case No. 1.—In the careless application of that article to the nerve of the superior lateral incisor, a sufficient quantity came in contact with the gums and process, to cause the destruction of a great portion of the incisive and canine fossæ, involving the loss of the tooth under treatment—also canine, and 1st bicuspid, two latter perfectly sound.

Case No. 2, Similar.—Application of same article to nerve of 1st bicuspis, resulted in destruction of process surrounding tooth under treatment, also 2d bicuspid and walls covering anterior fang of 1st molar, latter will require extraction, both last also sound. The operator in this case is the more inexcusable, owing to age and experience as a dentist. Again I say, young men, beware of the careless use of arsenic; employ cobalt, 'tis safest of the two, and see that the cavity is well sealed.

Treatment of a Tumour.—A young man, aged 23, temperament bilio-nervo, called upon me for the treatment of a fleshy tumour on the left side of lower jaw, originating from the presence of the fangs of 1st inferior molar; at time he called was wearing a poultice, as prescribed by a neighboring dentist. Upon examination, found the roots decayed several lines below marginal edge of process, gums swollen and quite covering them, consequently, concluded to attempt to extract them might prove

a failure and make matters *more* miserable. Finding that the adjoining tooth, 2d bicuspid, was decayed, nerve exposed, and knowing too well by experience, "that to catch game it must be by strategy or coaxing," concluded to extract it, and employ the opening in the alveolus as a channel for the exit of the matter during the suppurating stage; after extraction inserted a pledget of cotton to prevent cavity from closing, placed two strips of adhesive plaster, in form of X, over body of tumour; directed application of roasted fig to gums, advised compressure by the hand, in connection with the adhesive strips placed there for that purpose as soon as fluctuation was perceptible. Upon enquiry, if poultice should be reapplied, I answered emphatically, "by no means," as patient was suffering from general debility, also habit constipated: prescribed a tonic and cathartic. Result proved perfectly pleasing to myself, as I learned on third day afterward that pus was constantly oozing from the channel of extracted tooth. And, my dear Doctor, you may know how much better I was satisfied at the result than though I had been the cause of the presence of a most unsightly scar upon the face of that "beardless man," produced by a poultice, externally applied.

PAROTID DUCT COMPRESSOR.

Dr. Taylor, of Fort Madison, Iowa, has sent me a very useful instrument of his invention, for shutting off the saliva of the parotid gland. It is to be manufactured by S. S. White, of Philadelphia.

I have had a couple made by Mr. Spackler, of this city, somewhat modified.

Parotid duct compressors must become as common as are the present tongue holders. I have made daily use of mine for a month past, and now think they are indispensable. They will be referred to again in the next number of this Journal.

C.

Mechanical and Miscellaneous Department.

CLASPS FOR ATTACHING PLATES.

Read before the Mass. Dental Society, Sep., 1868, by J. T. Codman, of Boston, Mass.

The question whether or no clasps ought to be used in fixing or sustaining dental plates in the mouth, has sometimes been discussed among the members of our profession, and it is not uncommon to hear dentists say with a great deal of positiveness "Clasps ought never to be used in supporting plates" and then adding, as if it proved the statement, "They wear the teeth."

Dentists have so often made these statements that our patients echo them to us. I at this moment recall a patient who came to me wearing a large gold suction plate which had become loose, sustaining four front teeth, who had lost nearly all her teeth posterior to the first bicuspids, saying, when I proposed to cut the plate down and attach clasps to it: "They wear the teeth, don't they?"

They may in time, said I, but you get the benefit of the firmest attachment you can have in return for any wear you may possibly get.

"I should not like to lose my teeth by having clasps attached to them."

You seem to have lost a good many, Did you lose them by having clasps attached?

The lady felt the reproof, but took it smilingly.

Your teeth are of such a nature that you probably will lose more of them. It will be neither wise nor profitable for you to have a new plate for every tooth you may lose.

She confided in my judgment. I reduced the size of the plate, fitted clasps, and the patient declared she was never so well pleased; they were truly a real comfort.

It may be a gratification to some to be instructed by their patients on professional points, but I prefer to be judge in such cases.

I do not desire in this paper to enter on the discussion of the duty of dentists, but prefer that the judgment of each individual should guide him in the case that may come before him for consideration, and I believe, nay, I know that the manner of making and affixing clasps has more to do with the unnatural wearing of the teeth than the simple fact of wearing clasps to sustain a plate.

I do not agree with the positive style of statements so common among dentists and in dental literature, as for instance: A. declares that amalgam should never be used, and what is worse, that the dentist who uses it is—no matter what: some term that indicates his contempt of the dentist who uses it.

B. declares a man an "old fogy" that uses springs.

C. declares a man an ass who uses anything but gold for filling or for plates.

D. declares that rubber is the only thing to use for plates to ensure a fit.

E. declares a man is a fool who don't use a mallet.

F. knows the man is a fool who uses one, &c., &c.

Is it not the wisest to say, we will use anything that will secure the *best results.*

That clasps may, or must be worn at times for a longer or shorter period is indicated by the almost universal use of them for sustaining obturators, artificial palates, and regulating plates.

I, therefore, in this essay, desire to make known the mode of making and attaching clasps, adopted long since by myself, not for the purpose of claiming originality, but with the hope that some one wiser may show me a better mode, or that I may thus point the way to others, of rendering clasps when necessary to be worn less objectionable to the wearer.

Clasps are apt to be looked on as separate from plates, as something added to the plate, whereas they are, in reality, a portion of the plate extended around certain teeth.

I make this distinction because I consider that clasps cannot do well, however well they are fitted to the teeth, if they have

not support from a good fitting plate—that the relation is mutual between plate and clasp, and clasp and plate.

The requisites of a clasped plate are a good fitting plate, good fitting clasps, and a proper union between the two, making the relation perfect as though stamped from one piece of metal.

A clasp should fit the tooth "like a glove." It should be as near an absolute fit as possible to make it. It should be elastic enough to retain the original shape or bend after passing over the bulb or rounding surfaces of the teeth between the crown and the neck, and bear the strain that may come upon it in chewing, which is much less than is generally supposed, when the clasps and plate fit well.

To make a well fitting clasp, it is necessary to use a *thin* piece of gold plate (I use no other metal for clasps) of not more than 18 karats in quality. I prefer it should not be alloyed with platina, though such can be used.

Cut a pattern of the size and length of the clasp to be made, from a piece of lead or paper. In order to do this commence at the anterior approximal surface near the outside, and follow around the tooth close to the gum until the pattern reaches the outside five-sixths of the way around the tooth. Sometimes it is necessary to carry the clasp below or beneath the free margin of the gum, where the teeth are short and room for the clasp is scanty. As a rule, make the clasp as wide as it can be worn, and not interfere with the antagonizing teeth, or be in the way of speech or tongue, at the same time avoid, when possible, contact with the free margin of the gum.

Having the pattern made, cut a strip of thin gold wide enough to make the clasp, and with a small round-faced hammer hollow the plate on a block of lead by striking a few blows along the surface, enough so that when the gold is bent the concave surface will just fit the convex surface of the tooth. Then with a file cut out the places to fit over the alveolar ridge, and gradually bend the clasp to the model with round and flat pliers. This can be done by taking out the concavity of the gold where it is not needed with the pliers, and retaining it where it is of use.

You have now the clasp nicely fitted to the plaster tooth.

What next? *Try it* in the mouth and see if it is right. Having made sure of the fit, prepare a "doubler" or "stiffener" by cutting a narrower piece of plate to go around the clasp to increase its strength and elasticity. This stiffener may be alloyed with platina if desired, provided the stiffener or doubler be of less strength or power than the original, otherwise in bending or soldering, the clasp will bend to the doubler and the shape be spoiled. Solder this on, using small clamps, attaching it by degrees to the wider clasp with small bits of solder. As a general rule wide clasps need not be as stiff in proportion as narrow ones. In this way an elastic clasp unusually light and clinging is made, and with care, an almost perfect fit may be secured for any tooth.

I cannot agree with the common use of thick platina alloyed plate, or any thick plate for making clasps; I consider it unfit for any such purpose, and that clasps made of any such material must of necessity be a failure. To adjust the clasp spring it open a little, and with some good cement (I regret to say that I think we have none just suitable for this purpose, though sealing-wax or bees-wax does pretty well), after warming plate and clasp unite them, try in at once and adjust while warm. Bring the front or anterior surface close to the tooth, and when cool take it off with the greatest care, and mix a little plaster and sand pouring it over the inside, or palatine surface; when the plaster is set remove the wax, and with a bit of binding wire secure it to the plate, and catch on the clasp with solder. You may heat up with a blowpipe while the plaster is quite moist, by carrying the heat gradually from one end to the other, driving off the moisture before attempting to flow the solder.

There should be a slight space between the clasp and plate before soldering, about the thickness of a sheet of letter paper. If this is not so the solder flowing in between the two will have a tendency to force the clasp outwards or towards the plaster, occupying a portion or all of the shrinkage of the material. If, however, there is too much space, the clasp will be drawn in an opposite direction, and the extra space should be chinked loosely with a bit of plate. Always solder on and adjust one clasp at a

time, and then try it in the mouth; if it fits adjust the next clasp in the same way.

It is a good plan to catch on the clasp slightly at first, so that if it has been started a trifle in removing from the mouth, on trying it in it may be bent to place with a pair of pliers; after it is again imbedded in plaster and sand it can be soldered on firmly. A plate constructed in this manner, on being placed in the mouth, should remain firmly fixed, without rocking or tilting motion, with the point of the clasps exactly against the anterior surface of the teeth, so that when the clasps are sprung or bent to place neither plate nor clasp should be moved from its position.

With these precautions a good fit will be obtained. It is impossible to do otherwise, but after all, the final adjustment of the plate, *as a whole*, is what secures for it real comfort. A slight variation is attended often with a great deal of discomfort, and if the teeth are locked in, in such a way that by the closing of the under jaw, *no* variation from a fixed position is allowed discomfort may arise from even a good fit.

These precautions, then, are necessary. First examine the teeth that are clasped and observe if on both sides they antagonize tightly with the under teeth. If on one side no tooth antagonizes with the clasped teeth the case will adjust itself and secure comfort, but if the opposite teeth antagonize with sharp angles, "saddling" the one upon the other, the angles should be diminished with file or scraper to allow of more lateral motion, and to give the clasped tooth, or teeth, a chance to move slightly from its former fixed position and adjust itself to the slight variation imposed by the gold bands or clasps. If these important points are neglected the clasps will wear the teeth; will make the teeth sore, for it becomes a struggle between the plate on one part and the unyielding enforced position on the other part, and at each closure of the mouth a wearing motion is made, and the tooth will suffer attrition of the enamel, and disintegration or inflammation, looseness, and finally, loss of the tooth will be the result.

The same loss takes place if the plate does not set squarely to its position, and motion is kept up from leverage, from chewing, or from pressure of the tongue.

DISCUSSIONS IN THE MISSOURI STATE DENTAL ASSOCIATION,

AT THE ANNUAL MEETING, JULY, 1868.

Reported by W. H. Eames, D.D.S., Recording Secretary.

ABSORPTION OF THE ALVEOLI.

Dr. Chase: This is the result of so many different causes that it would require hours to do the subject justice. There is an absorption, however, which is very common, which is produced by mercury given to children. Although its deleterious effects are not visible when largely administered before three years of age, yet its effects are persistent and often crop out during adult life, producing the most disastrous effects on the alveoli and teeth. The treatment should invariably be constitutional as well as local. Have found nitric acid and iodide potassa beneficial as internal remedies—they must be long continued. The general habit of the body must not be overlooked, and remedies given to combat scrofulous, syphilitic, or other conditions of the blood.

Local treatment must also be employed. Uses nitric acid, carbolic acid, iodine and chloride of zinc as stimulants to the periosteum and the alveoli.

It is important to take these cases early, and if we arrest the disease it is a great good accomplished, even if we fail to cause a new growth of gum. Thinks absorbed alveoli are sometimes renewed, and might often be restored if our patients did not become disheartened by the long time required to produce the desired results, and so they fail in their opportunities and we consequently fail in our cause.

Dr. Spalding:—

This is a formidable disease, of very frequent occurrence, and one which has heretofore been treated with perhaps less success than any other within the range of dental practice. We have almost daily evidence of its importance in those teeth that are being gradually loosened by its ravages, and which in the absence of this disease would have been useful for a life time. The first

question which presents itself in this discussion is: Is this disease curable? Now, it is either a curable disease, or it is not. If it is not curable, we have nothing to do but to allow it to complete its destructive work, and console the patient with the assurance that one after another his teeth will be lost, till all are gone. If it is curable, the dentist should leave no stone unturned, no experiment untried, which promises any degree of success, till a remedy is found. In my opinion it *is* a curable disease, at least it may be arrested and brought to a stand-still. So much every practitioner may accomplish; but the restoration of the lost parts is a much more difficult matter, and one which requires close observation and a skilfull handling of the local remedies employed. Success has attended my own efforts in the later years of my practice by prompt and continued treatment, kept up in fact until the progress of the disease is stopped, which is indicated by the cessation of pus formation and absence of all inflammation of the gums.

As local applications I have employed the remedies recommended by Dr. Atkinson, of New York. Considerable experience is necessary to enable one to determine how often the case should receive treatment, and how long the use of a particular preparation should be continued. I would use the first preparation in Dr. Atkinson's list, (viz: a saturated solution of iodine in kreosote) in all severe cases; indeed in all cases where much pus is discharged. The application should be made once or twice a day at first, and less frequently as a perceptible effect is produced. Caution should be exercised in the use of this remedy on account of its great potency, and its use discontinued as soon as the formation of pus ceases. Milder remedies, such as tincture iodine, glycerole of iodine, &c., should succeed. As soon as the exudation of plasma takes place, it should be carefully preserved and protected against friction, if necessary. The first named preparation is capable of destroying this young plasma, and its use should be avoided till the new growth has become well organized.

In long standing cases of this disease, necrosis of the thin margin of the alveoli has often taken place. The removal of

this dead bone is a necessary preliminary operation, as is also the *complete* removal of all accumulation of tartar around the necks of the teeth. For this purpose, sharp, thin, yet strong instruments are required, and no amount of treatment will be successful in the absence of this surgical operation wherever foreign or dead matter exists as an exciting cause of disease.

Constitutional treatment must also be resorted to, or a recurrence of the disease is almost inevitable. In my opinion a large proportion of cases of this disease arises from mercurialization. I have an evidence of this in my own case, where, as I believe, the existence of this disease is the result of a mercurialization twenty years previously to its appearance. During all this period disturbances of the health were frequently accompanied by an irritable condition of the peridental membranes, showing that the effects of the mercury, though latent, still existed, ready to be called into activity whenever diseases, or the lessened vitality of declining years should favor a development.

I am a homœopath, and my constitutional treatment of late years has been in accordance with that system of medication, having previously tried other methods without success. Constitutional treatment should succeed, and not accompany the local treatment. I am fully sensible of the effects of want of cleanliness and general neglect of the teeth in inducing this disease, yet I think an enquiry into the history of the case will generally show that mercurialization has been a probable predisposing cause.

Dr. Porre:—Had a case of absorption with profuse suppuration. Made use of the chloride of zinc as a local remedy after removing all accumulations of tartar. Discharged his patient cured after five or six months treatment.

Dr. Black:—Asks was this disease produced by animalculæ?

Dr. Spalding:—The disease produces the animalculæ and not the animalculæ the disease.

Dr. Chase:—

Animalculæ were found in many places of the mouth where they would never be suspected; for instance in carious bone, but no one ever supposed the animalculæ were the cause of caries.

He was not so modest as Dr. Spalding about constitutional treatment. It was open to everyone to speak homœopathically or allopathically. On his own part, he had said he had given phosphorus, but he would not dictate in what quantities it should be given. To get the mercury out of the system was the thing, and iodide of potassium and nitric acid in small quantities would be found most excellent. Of course the patient would expect local treatment, and ought to receive it, but it was certain that constitutional treatment was the great thing.

Dr. Spalding :—

Constitutional treatment would be of little benefit at first. In cases of necrosis, surgical treatment should be the first consideration, then local and constitutional treatment, and these must be in harmony, or the one may counteract or neutralize the effect of the other. In cases of mercurialization, nitric acid was undoubtedly good, but its strength must depend entirely upon the amount of mercurialization. When, however, no trace of mercury is exhibited, he would use phosphorus in homœopathic doses. In cases of suffering from inflammatory symptoms, especially periostitis, he would use crude antimony also, homœopathically.

TAKING DIFFICULT IMPRESSIONS.

By Dr. F. A. Brewer, Palmyra.

Take a wax impression, from which prepare a plaster model. From a sheet of tin, lead, or wax cut a pattern full size of plate or covering the parts of which you wish an impression. Cut from a sheet of rubber a piece the size and form of pattern. Warm the rubber slightly and bind down on model with string or band, place it in the vulcanizer, cover with water, and heat up to 310° for one-half to three-fourths of an hour. Take out, clean up, trim and polish. Serrate or roughen the palatine surface, then cover with a thin coat of plaster and take your impression.

If the teeth incline toward each other and you have had to

cut away from the plate to accommodate them, it may be found a little difficult to remove the impression from the mouth; it may be readily removed by first breaking away the plaster off the extended portions, which, if desirable, can be returned to their position when the impression is out of the mouth.

Several plates of this character might be gotten up preparatory to the visit of the patient.

When an old plate, which is not sufficiently high in the arch, is used, the arch may be raised with a rim of wax as with cups in general.

Feeling assured that an accurate adaptation, and the blessings of my patients more than repay my extra trouble, loss of time, etc., prompts me to adopt this mode of practice.

DR. STUCK'S PATENT RUBBER PLATES.

In the January number of the Journal we gave our readers Dr. Stuck's method of constructing rubber plates, as taught by his agent—classing it among the humbugs of the day. In the March number we published a letter from Dr. T. G. Lewis, of Buffalo, on this subject, which leaves but little on which Dr. S. can base his claim to a patent. To keep our readers posted, we copy the following from the proceedings of the Odontographic Society, of Pa., published in the *Cosmos:*

"Mr. Levi Stuck, of Ohio, described a method of making metallic dies from plaster impressions. Lead or bismuth may be used, but he prefers the purest block tin. The process for vulcanite work he offered for inspection. The plaster impression has a little vent or slit cut in it, corresponding to the mesian line of the mouth, from the part where the air-chamber is placed to the back of the plate, and into this run smaller openings of the $\frac{1}{8}$th or $\frac{1}{16}$th of an inch in length. The cutting is performed by carefully drawing backward on the plaster a delicate saw made of a watch-spring. The impression, thus prepared, is dried by being heated up to 212°, and while yet warm the molten metal is poured into it.

"The trial plate is made by burnishing sheet tin, a little thicker than it is proposed to make the plate, upon the die; it shows upon both sides the rugæ of the mouth, and is of a uniform thickness. The teeth mounted as usual upon the trial plate, by wax over the backs, pins, etc. After being fitted in the mouth, the case is placed in the flask, upon the tin die, and the plaster mould for the work is made in the ordinary manner. The latter being prepared with gates to the upper part, or that which comes in contact with the lingual surface of the plate, is covered with very thin sheet tin, and the work of packing and vulcanizing completed as usual."

From the last number of the *American Journal of Dental Science*, we learn that Dr. S. recently visited Baltimore, and personally explained his method of manipulating rubber in such a satisfactory manner, that the editor was induced to give it a trial, and he says, that his experience with it since Dr. Stuck's visit enables him to speak of it in the highest terms, and recommend it to his readers. So in his opinion, the *improved* and *perfected* method of Dr. Stuck is no humbug.

TO REFIT RUBBER PLATES.

Cover the gingival surface of the plate with a thin sheet of warm wax, placing an extra thickness over those portions where absorption has taken place to a greater extent; then placing the teeth in the mouth let the patient press them up to the gums by a natural occlusion of the antagonizing teeth. No model need be made separate from that made in the flask. Invest so as to pack from the gingival surface. In this way the occlusion (articulation) is perfect.

Holes may be drilled in the old rubber plate and countersunk to retain the new rubber. What is still better, and quite as easy, is to heat up the set after it is flasked until the old rubber plate is softened, then remove it, as you would a trial plate, and pack with new rubber, and thus make an entire new rubber plate with the old teeth. C.

FUSIBLE METAL.

Lead, eight parts; bismuth, fifteen parts; tin, four parts, and cadmium, three parts; melt together. This alloy is white like silver, and does not readily tarnish; its specific gravity is about 9.4, and its melting point about 140 fahr. It may be used as a solder for metals which are not to be exposed to the heat. It may even be applied under water, and may be melted on a piece of paper held over the spirit lamp.

NEW GALVANIC EXCITING LIQUID.

Mr. Delamier, in a communication to the Academy of Science, states that the following mixture forms an exciting liquid for galvanic batteries of great energy and economy, disengaging no deleterious fumes or gas: Dissolve twenty parts, by weight, of proto-sulphate of iron in thirty-six parts of water. Then stir in seven parts of a solution of sulphuric acid (equal parts); then in the same manner, add one part of diluted nitric acid (equal parts).—*Scientific American.*

ERRATA.

On page 113, 9th line for "of central" read "and central."
On page 113, 12th line, for "out bits of surplus" read "outlets for surplus."
On page 113, 17th line, for "vulcanizer" read "vulcanize."
On page 114, 7th line, for "not so thin" read "not so thick."
On page 114, 9th line, for "sustain" read "retain."

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VALEDICTORY ADDRESS.

Delivered by Professor J. S. B. ALLEYNE, at the third annual Commencement of the Missouri Dental College, March 8, 1869.

GENTLEMEN OF THE DENTAL CLASS:

The occasion on which we meet together this evening, this pleasant reunion of teachers, pupils and friends of a dental college, at its annual commencement, how appropriate soever it may be acknowledged by all, is not without a certain degree of novelty.

We are grown accustomed to the anniversary exercises of our literary institutions; we participate constantly at the graduation of our medical classes; such observances are time-honored; these early spring festivals, these midsummer recreations, these autumn gatherings of the student's life, mark a time, a progress, an epoch. It has been left for this present generation to inaugurate dental colleges; it has been left to this present day of advanced educational ideas, to say that this specialty, dentistry, shall be approached and studied like all other branches of scientific knowledge, for itself alone, and hence in the manner most conducive to its promotion. What was before hidden in the general mass of medical knowledge, is now separated and cultivated by itself, and now at this comparatively late date in other parts of this country, certainly here, in this very present, in this western valley, thanks to the character and energy of a few men who pursue science for its sake alone, before ever we have become aware.

dental colleges have been founded and take rank with older institutions of learning as well in their meritorious labors and beneficial results, as in those common usages which endorse the individuality of such members who from time to time are elevated to the honors and privileges of this scientific pursuit.

Such a name Dentistry does indeed merit; an occupation merely, which before was so limited as to engage the attention solely for the relief of pain in the teeth, either by medicines or by a rude extraction, applied by the most indifferent hands, has become so extended, has so multiplied methods of assuaging human suffering in this direction, as to demand the best labor, the highest skill and ingenuity, the most earnest thought from those who venture in its pursuit. Medicine may well have surrendered this domain, for it has surpassed the ability of the general practitioner to compass, and if not the skill of the surgeon, at least he leaves it with great propriety to be cultivated by a few.

Elevated to a distinct rank therefore, and holding a conspicuous position among the various branches of medical science, yet by no means detached from it, on the contrary, most closely allied—how gently and imperceptibly does Nature love to blend all in one harmonious whole—it is most fitting that in its study, its practice, its teaching, it should in a measure be withdrawn from the main body. The greatest success can thus only be attained; the most undeviating progress can thus only be made. It is one of the greatest evidences of advance in the intellectual culture at the present day, that laborers in the field of knowledge are willing to divide and subdivide their forces, that by concert of action the goal to which all tend may be the sooner reached. The most delicate mechanism, or even a rude invention, requires many hands and minds in its construction; so does every branch of knowledge, every branch of the healing art, require many minds for its successful pursuit. If this conclusion has been reached, surely the fullness of time has come when a branch of knowledge so distinctive in character as dentistry should be taught for itself alone; schools for this purpose arose, and what before might have been considered as of questionable utility, has become within a few short years of acknowledged necessity, so rapid has been

the progress in this direction; and now dental colleges are a feature of the general educational ideas; we accord to them the standing and influence which belong to other institutions of learning; we require that the dental profession should be gauged by the standard adopted by such colleges.

With what uncertain steps man has groped his way along the path of ages up to the present stage of intellectual culture in this century history shall hardly inform us; a few bright lights scattered here and there serve to illumine for a space the dark pathway, but beyond all is impenetrable gloom. A few individuals by Herculean strength raised themselves above the mass of desolation, and have sent down to us thoughts and wisdom at which we now look with amaze; inspiration must have enlightened them; but what has become of the countless millions who lived and died, whose names as nations even are utterly blotted out? They must have lived for a purpose; the force that each individual exerted whether physical or mental, was not annihilated. Has it not fermented all nature? and are not we now in a measure subject to its influences? How far we might be benefited by the record of nations, if it could have been handed down to us, which have left no sign among men, it is impossible to say. The book of nature has been opened to us in this generation, disclosing wonders which transcend belief; the rocks and the hills and "the waters under the earth" write out such histories of the ages of this globe, that in comparison with which, man's existence thereon is but as a day. Would it have been of much advantage within this modern period, for man to possess a full account of his own rise and progress, of the nations that have been born and have died, or have been absorbed by more mighty ones? His career would not have been changed; he himself could not have reversed his advance to the present time. Influences, physical influences, act upon man, as they modify and change the surface and depths of the earth. The inhabitants of the tropics live differently from the hardy mountaineers, or the rugged men of the heath: the character of the one succumbs to the impetuous temper of the other. The advance of the nations from East to West, with a gradual upward tendency in their intellectual condition; the

yielding of one people, giving place to another; the circumstances around us and with which we surround ourselves, are as plain an indication of the preparation which has been going on for centuries to reach our present standard and carry us still further beyond, as the order of succession in the strata of the Earth's crust, and the changes that were going on during the formation of each stratum, are indicative of the advance from the first age when there was no life on the globe, through the following ages, till everything was at last prepared for man's life.

Why do I refer to all this? Simply to say, we are now developing the germs that were planted long ago; that the influences which sprang up with the first man have amassed along the road of ages, till now they burst in full strength upon us, and we are absorbing and assimilating them to our use. We take the flattering unction to our souls, that this is the age of progress in all that concerns our welfare, begun and continued by ourselves alone, without any reference to the distant past, when the great thinkers and even the multitude in their humble way, grappled with the physical and mental problems, which in many instances we have solved, and succumbed before them. Just as the individual wraps himself up in the cloak of his success, when almost every thread has been woven into it by the circumstances around him, those of birth, those of ancestry even; the present possessor wearing it and handing it down to the next generation with perhaps here and there a purple patch attached to it.

Let us make due acknowledgement in speaking of the present progress of science, whether medical or otherwise, for what has been done for us in the way of assistance. Errors, and numerous, there were, in the ancient doctrines of philosophy and medicine, but such only as of necessity resulted, when we consider the imperfect appliances, so to speak, which were used to work out the questions of the day. With the ancients, all such problems as of politics, of morals, of physics, of medicine were wrought out in the closet. The field of science embraced the cultivation of such theories as universal being; so speculative were all the problems concerning nature, that some of the best and wisest men, as Socrates, discarded the whole subject as being

unattainable and worthless if attained. Such errors, in a measure, grew out of the vastness and insolubleness of the problems with which they grappled, and in a measure from the desire to explain everything. Yet, as in medicine, Hippocrates, apart from his theories, has transmitted to us as carefully and accurately prepared descriptions of the diseases which he saw, as can be found at the present day in the best works on the same subjects. The reputation of such a man, and his influence for good are felt even now, for he first taught the value of actual observation in the study of disease, giving to medicine a separate existence, where before it had been overgrown by the rank weeds of superstition. From his time to that of Galen, a period of six hundred years, we find the most important epochs of scientific antiquity; and for twelve centuries later, we find the influence of Galen dominating the medical world. However injurious this blind submission may have been to the progress of science, it was successful in this, that it diffused everywhere the positive knowledge, which had been up to his time acquired in medicine; he formed the connecting link between ancient and modern medical science—I speak of medical writers; the remarks are applicable to other philosophers; the large and generous spirit of such men forms a mould in which the noblest philosophies of earth may be cast.

We live in a busy age; ought we to say more than that? Giving all due credit to this age, as one of scientific discovery and invention; magnifying to the utmost, as creations of our own, the results which the moderns have attained in intellectual pursuits, we must not forget that the age is the resultant of all the forces which have been constantly applied before. Alchemy led to chemistry. For centuries the alchemists worked assiduously to discover the *alkahest*, or universal solvent; in this they failed, but discovered the acids, which almost answer the purpose. They sought for many generations the philosopher's stone, which should transmute the base metals into those more precious; this eluded their search, but they brought up from the deep unknown a vast number of new facts that have proved of more value than the mysterious stone. They found not the elixir vitæ: but they

discovered much that relieves mankind from pain and sickness, thus adding to the enjoyment of the allotted space of life. Though they worked blindly for selfish ends, the result of their labors was the clearing of the field and preparations of the ground for the grander and more universal science of chemistry.

It is but shifting the scene, and the actors appear; the actors give expression to the scene. Do not say, that if such a man had not lived, such results would not have happened, such discoveries would not have been announced. On the contrary, the events had approached their birth. The readers of history will call to mind the famous dispute between Newton and Leibnitz, both original inventors of the infinitesimal analysis, Newton being the earlier; Leibnitz, however, published his method twenty years before. Chemical history is full of such simultaneous discoveries by independent inquirers. An illustration of this application of certain remedies in one direction is known by all when we speak of anæsthetic agents. Ether was referred to in the latter part of the sixteenth century as producing insensibility in inhalation; it was recommended in 1795, and thereafter, to be inhaled in certain pulmonary complaints for the relief of pain, and not until 1846, in September, were the first series of experiments performed, to demonstrate the anæsthetic powers of the agent. In 1831 chloroform was discovered, almost simultaneously, in this country and in France; it was in November, 1847, recommended as a substitute for sulphuric ether, as the result of experiments to discover something superior to ether. Since then, chemists and physicians have been busy in discovering other anæsthetics to swell the list, or to answer as substitutes.

But the present is full of encouragement to the earnest seekers after nature's wealth; if but now we have developed some truths, which ages ago dawned on the human intellect, even now our aspirations are so intense as not to be satisfied until we have penetrated the inmost temple and raised the sacred veil. Problems which before were abandoned in utter despair ever to grasp their import are now seized upon with avidity and almost solved, as new facts have arisen which tended to enlighten. We are not appalled by the immensity of the discoveries which are constantly

arising before us; we hardly express surprise, on the contrary, we use them as a matter of right, we are almost insensible at times to their sublime signification. The astronomer maps out space before us and fills it with worlds; he tells us how they are made and of what: he points at one on fire and tells the composition of its combustible material; he shows us one in formation and calculates the time when it may become habitable; the microscopist descends to the invisible world and brings before our dazed senses the punctum saliens of all organic life; he tells us how it is found, how it grows, how it builds up our organism, whether animal or vegetable, one would almost say that we see the life, the vital spark, that now we understand it, especially when the chemist makes these organisms by his enchantments. Yet such things are known for facts, we use them, we handle them every day, and think no more of their wonderful import than does he care for the wire which passing in ocean's depths from continent to continent, flashes the news of the fall of an empire, the state of the market, or some fond nothing worth to him all the world besides.

But let me not be understood as saying, that familiarity with these important and wonderful acquisitions of man's intellectual efforts breeds contempt. I know of no harsher and yet more common accusation against him who is penetrating the recesses of nature, than that such studies lead to materialism, that man can arrive at a knowledge of all things. In certain instances this may be true, but I would rather prefer to believe that in the intensity of his pursuits he forgets to look from nature up to nature's God. It surpasses belief, that in discovering the perfections of this microcosm or this macrocosm and in defining the laws to which they are subject, that we should be able to repress the inmost conviction of a Great First Cause. The very love of such studies implies a refinement of one's intellectual, if not spiritual nature; man cannot, if he would, debase himself and sink crushed to earth by his vain pretensions.

After all, let us acknowledge that our wisdom extends hardly beyond the enunciation of certain laws which govern the universe; we know not why things act upon each other in the way

we see; we speak of affinities, sympathies, attractions, repulsions, they are mere terms to express what we see and veil our ignorance. We say that the plant grows by absorbing heat and moisture; that force transfers itself from one direction to another and manifests itself in a different form, as by the appearing of an organism, where before, as in a seed, we saw no sign of life; how that this change takes place, who can tell? It is something to say, however, that we have simplified questions a little; that where there were several forces we have reduced them to one; just as we have simplified the elements of the ancients, by coming down to a gas, or a few unchangeable earths.

Let us be satisfied for the present to say, that we are proceeding in the right direction to make further discoveries in science. Where before we sought to make nature conform to the fancies of our brain, now we are content to follow the path which simply observation and experiment point out. How often has the progress of medical science been impeded, and it is true, even now, by the inventions of the physician to explain what he did not know. The whole history of medicine is marked by the ruins of theories, which oftentimes did not protect the originator, but involved him in their destruction; and yet again have lasted centuries, marking, like the pyramids, the course of time, but not showing by any internal or external evidence the purpose for which they were created.

This has ever been the danger to the undeviating progress of science, the attempt to explain everything and at once; a few circumstances given, a general conclusion is drawn, and we have a theory which shall turn our aim from the direct object, perchance for a century. Did we know the shape of the atoms of any medicinal substance, says a writer, we might tell beforehand how it would act. Is it not conceivable, says another, that according to the shape of atoms, whether round or angular, so will their actions be mild or harsh, when applied to the textures of the body, fitting or not fitting as the case may be.

But time tries all things; with every effort some advance is made in human knowledge, however trivial. These theories

after all are the thoughts, inseparably connected with man's mental constitution. They change from circumstances, they change from fashion, they are modified by all the influences which surround us. Still man thinks, unabashed by his errors, and from time to time he shall see a slight glimmering of the truth, it comes from the hither shore. Happy he who shall be so fortunate, thrice happy if he acknowledge the Infinite Source.

Gentlemen graduates of the Missouri Dental College—I have called your attention, very succinctly it is true, but time did not otherwise permit, to the few great truths which at present influence the scientific world. I have done so for the very purpose that you should be impressed at this critical portion of your career with the fact, that important and rapid changes are being made in every direction of scientific pursuit. When the chemist determined that in his manipulations with matter not an atom was lost, though it became invisible, he was leading the way to the greatest discovery of this present century, that the imponderable agents, so called, as heat, light, magnetism, are different manifestations of the same thing, are immaterial forces; in other words, that nothing is lost in nature, though it become changed, though it act in a different direction. With this great fact dominating, you can conceive what a revolution must result in our present ideas of everything. It is not chemistry alone, nor physics, but the whole range of science will be affected, not so far as facts are concerned, for they are unchangeable, but so far as the explanation of nature's laws goes. This is but one of many advances in science, but it shows the necessity of renewed exertion in our pursuits; it may be in part to undo what we have prepared, or in part to strengthen our position; certainly to keep pace with the most active. You, gentlemen, have reached the point where you must become responsible for your thoughts and actions; our thoughts can no longer be yours; you must work out life's problems singly and alone. Do not wait for the approbation of others; it will come with your well-doing, but too late for any advantage that you may derive from it. From your own conscience seek the reward of your good deeds, as from that alone in this world will you suffer from perverse

actions. But the watch-word with you is to labor—work and work always, my friends, were the last words of one whose long life and success will ever be an exemplar in the profession. It will pay you as the world goes, it will pay you in happiness, it will prolong your existence, and you shall be honored among men.

Fortunate for you that your profession is so circumscribed, I speak in the scientific sense of the term, as to remove you from the baneful influence of the theories which have retarded the progress of medicine,—these figments of the brain; these fashions of thought; these mannerisms of pretensions to science, to attract the multitude by their gaudy hue. Believe me, my friends, we are not yet so advanced as to formulate disease, or the remedies which we shall administer.

With you it is a direct application of positive knowledge to the ends in view; with you opinions are worth nothing, if they cannot be weighed in the balance and stand the severest tests.

Love your profession for its sake alone; the affection will be returned four-fold. You must live by it, say you; you shall live by it, if pursued with this spirit. Do not, with mercenary soul, count the gains which this calling shall preferably give you; look upon it with generous heart, and think of the influence which you may wield for good, and you shall not be disappointed in this world's gifts. The larger the investment of these good and noble impulses in the work that is before you, the greater the return in everything that can produce content; on the contrary, the more ignoble the purposes of life, the less the reward, and at the end you shall write failure.

Looked upon in no other light, it is a duty which you owe your profession, whence you derive position and profit, to so comport yourselves as to reflect honor upon it. You have no right otherwise to act; certainly when you appreciate that your alma mater has placed to-night in your hands a trust so sacred, that you must guard it with your whole soul. Go forth then, armed with the high resolve to work with the strength with which you are endowed, by each struggle formed to vanquish; go forth nerved with the noble purpose of doing the good which

you can find to do; your alma mater will ever look upon you with tender regard, what she asks in return is, that occasionally in your onward career you shall look back towards her with affectionate remembrance.

In the name of the Faculty, I bid you one and all farewell.

From *L'Art Dentaire.*

MEANS OF COMBATTING ACCIDENTS CAUSED BY ANÆSTHETICS.

Translated by H. Judd, M.D.

MM. Legros and Onimus propose the following method: It is sufficient when the respiration is arrested to apply the two poles of an electrical apparatus for constant and continued currents: one (the negative) in the mouth and the other (the positive) in the rectum—the respiration and circulation will immediately reappear. It was not by chance that we employed the means which is based upon physiological ideas easy to demonstrate. It was in the course of a purely scientific labor upon the action of continued currents, that, struck with the influence of continued currents upon the respiration and the movements of the heart, we thought of employing them in poisoning by chloroform, where, as is known, there is an arrest of the heart and circulation, a kind of syncope, which rapidly becomes fatal. We have in our hands means of reanimating the movements of the heart and even of causing them to reappear after their complete suppression; provided the suppression be recent. The success exceeded our hopes, and in spite of our anticipations we have been astonished at seeing animals submitted to the action of anæsthetics and in a state of apparent death for two or even three minutes return gradually to life. Dogs, rats, and rabbits have been in this way resurrected when we had pushed the poison to the greatest extent, and it is certain that in man, where anæsthetics are employed with so much circumspection, results will, *a fortiori*, be likewise satisfactory. We will not weary ourselves by a recital of our experiments; one will suffice. In a laboratory situated near by where our apparatus for

continued currents is located, a dog had been placed under the influence of chloroform to be operated upon; the chloroform, given without discretion, arrested the action of the heart and the respiration. They tried artificial respiration, which failed; then they thought of bringing him to us. It was necessary to untie the animal and transport him into the room where we were; but in spite of this loss of time the continued currents reanimated the dog. We have employed the apparatus of Remak. One might likewise make use of the piles of the sulphate of lead; it is important to have a strong tension and moderate chemical effects. The apparatus of Remak completely attains this end, but it is a great inconvenience that it is not portable. It will be easy, it is true, to have these piles under the table in the operating hall; in town, transportation is incommodious. Many manufacturers are now seeking to make portable piles which will answer the same purpose as the piles of Remak. If they succeed the only inconvenience will be remedied. At the beginning of our experiments we thought that it would be necessary to make use of a great number of elements, but now we are convinced that twenty piles of Remak will suffice; we use ten piles for a dog. The only precaution to be taken in the application of the electricity is to avoid interruptions; the current ought to pass continuously until the respiration is completely reestablished, and then cease; if the respiration becomes weak again the current should commence again.

We do not pass in review the other means employed in accidents caused by chloroform. All, with the exception, perhaps, of artificial respiration, have been useless. We insist that the best means of completely arresting the action of the heart enfeebled by anæsthetics is to make use of a current of induction. These interrupted currents, and currents of induction have been known before, and their use cannot be too strongly condemned. One should hesitate to employ those apparatuses which determine precisely the results that we desire to avoid. We have demonstrated that continued currents, the action of which is entirely different, act favorably in poisoning by chloroform, sulphuric ether and protoxide of nitrogen; they have a less remarkable effect in the asphyxias and poisonings by certain toxic gases, because in these

cases there is a lesion of the blood against which electricity is powerless. One should nevertheless try them in the asphyxia of still-born children. But there is a terrible accident where their efficacy is truly admirable: it is the syncope which succeeds the loss of a large quantity of blood. We have seen an animal whose carotid artery had been opened and who in consequence of the hæmorrhage was in a condition of apparent death, but the continued currents reanimated the respiration and the circulation. Upon ceasing the use of the electricity syncope reappeared, to disappear again upon the employment of the same means; three times there was the same result, but the last time life persisted, the animal lived two days and died in consequence of another operation. *En résumé*, in all cases where there is an arrest of the action of the heart and of the respiration without alteration of the blood, and especially in the accidents due to chloroform or to syncope, the employment of continued electric currents surpasses all other means at present known, and is destined to be of great service.—*Gazette Hebdomadaire.*

Operative and Surgical Dentistry.

ANÆSTHESIA—SULPHURIC ETHER.

Nitrous oxide has come into very general use as a dental anæsthetic.

As such it is certainly useful: but in becoming *fashionable* it has thrust aside an anæsthetic which is far more convenient for many practitioners, which is pure sulphuric ether.

Many persons suppose that nitrous oxide furnishes oxygen to the blood, and that it is therefore more physiological than ether or chloroform. This is not so. Nitrous oxide is a chemical combination, and is not decomposed in the lungs.

Atmospheric air is a *mechanical* mixture of oxygen and nitrogen, and the blood appropriates the oxygen, which it does not in

the inhalation of nit. ox. I believe a person would die as speedily from the inhalation of nit. ox. alone, without the simultaneous respiration of atmospheric air, as he would to breathe any gas which was *deprived* of oxygen. Life may continue longer by the expansion and contraction of the lungs than by their quiescence, for by this action the heart is assisted in its motions.

The countenance of the patient is often very bad when under the influence of nit. ox. The eyes roll up, and are often bloodshotten. The lips are blue, and show a lack of decarbonization of the blood. In fact the patient appears as though he would soon die "for want of breath." Now these results seldom are seen in the administration of pure ether. The writer has given ether for dental purposes in several thousand cases, embracing a period extending from its first introduction to the profession by Dr. Morton, of Boston, up to the present time. I have never seen bad results from its use. Patients remain quietly breathing the ether, without change of countenance or color of lips. The pulse remains as full as when the operation commenced.

Stertorous or noisy breathing takes place towards the last part of the etherization, *in some persons*, but the majority of patients cannot be brought to this point; the respiration becoming more *quiet* as etherization approaches its accomplishment, notwithstanding your request to the patient to "breathe harder."

One objection to sulph. ether is its odor, and this is I think its principal one. But it is always *ready*. You need not be out of "gas," as one sometimes is when using nit. ox. The latter should be fresh, and although some practitioners are able to keep it in working order for weeks without renewal, yet the majority of those who use it, find it necessary to make it fresh every two or three days. Those who have but few teeth to extract find it very annoying to do so, and moreover, financially unprofitable.

Now I wish to say to young practitioners and those who have not had much experience with anæsthetics, and those too who do not for various reasons wish to purchase a first class nit. ox. apparatus, that they may with great propriety make use of ether in the extraction of teeth, without fear as to its results. This

cannot be said of chloroform, for the frequent deaths from the use of the latter warn us to let it alone.

HOW TO USE ETHER.

We must have the best, purest and strongest ether, and this is called "ether fortior."

It should have a specific gravity of .750.

If placed in a test tube, and held in the palm of the hand, it should boil.

It should contain no acids, and therefore should not redden litmus paper.

It should not lose more than one-fourth of its bulk when mixed with an equal quantity of water. It should entirely evaporate when poured upon bibulous paper, and should leave no odor.

The patient should have no *severe* organic disease of the heart or lungs. Still those who have had much *experience* may discriminate. I have often given it to persons considerably broken down with consumption, and also to those subject to intermittent pulse and palpitation of the heart, and never with unpleasant results, as far as could be observed.

I consider cerebral congestions more adverse to the use of ether than any other ailment.

The patient should be loosely dressed, so as to give free play to the heart and lungs. Seat her in the operating chair, and make an examination of the mouth carefully, so as to determine what your operation is to be. Select your instruments, without parade, and if possible without the patient observing what you are doing. Unpleasant impressions on her mind should be avoided, as they are likely to be persistent, and to be carried in her mind through the stage of etherization. A cork, with a string two feet long attached, is to lie placed between the teeth to keep the mouth open while you are performing your operation, as the patient will almost invariably close the jaws when she has become unconscious, and thus prevent the entrance and manipulations of your instruments. The cork should be placed before etherization commences.

Take a towel and fold it, so as to be about six inches wide; wrap it around your fist, and pin it; withdraw your hand and place a sponge of greater diameter in the middle. The end of this tube should enclose the nostrils and open mouth. Pour about one ounce of ether on the sponge and place it *near* the mouth. If you cover the mouth at once you will strangle your patient. After two or three inspirations you may place it closer to the mouth, and after one or two more it may be pressed tightly about the mouth and nostrils, so that atmospheric air can only be gotten by its passing through the sponge. The distal end of the napkin must not be closed; it should be an open tube, only closed by the sponge. More ether may be poured upon the sponge from time to time as needed; a great spoonful or so. From one to four ounces will be used, according to the susceptibility of the patient. The time required for full etherization will be from one to ten minutes.

In *prolonged* cases, eight or ten drops of chloroform may be poured on the sponge. As mixed liquors quicker intoxicate, so do a few drops of chloroform added to the ether increase its action very much.

When stertorous breathing occurs you may know that etherization is completed; lift the hand and if it falls *dead*, the significance is the same. Pinching the skin of the patient's hand is another means of deciding the point.

After etherization commences, have no talking or laughing in the room. If you speak to the patient, or to an attendant, let it be in a low and gentle tone. The best effects will be produced by *quiet*.

Before operating in the mouth, let the attendant gently but firmly grasp the hands of the patient, and hold them until the operation is finished.

Patients, though unconscious, sometimes lift their hands when instruments are placed in the mouth; just as some *sleepers* raise the hand to brush away a fly upon the face. If a succession of etherizations, at one sitting, are necessary to finish the operations in the mouth, let as little time as possible elapse between; less ether will be required, and time economized.

As soon as the operation is concluded the blood should be wiped from the mouth, or the head bent forward, so that it may be evacuated. Patients do not swallow when fully under the effect of ether. If the head is thrown back, anything in the mouth is liable to get into the trachea; therefore loose teeth and blood must be looked after and removed.

Do not begin to ply the patient with questions as soon as she "wakes up," neither ask her questions to awaken her. Don't ask if she knew when you extracted the tooth, or if it hurt; if you do, ten to one she will answer in the affirmative. If you wait until she fully recovers, and first speaks herself, she will say that she knew nothing about it.

You may quietly bathe the face and forehead with a sponge, and if she be long in "coming to" let her smell of ammonia. Sometimes a teaspoonful of brandy is useful in making her "feel all right."

In rare cases your patient will cease to breathe, if so it will be owing to a retraction of the tongue, closing up the glottis. You must seize the tongue with forceps and pull it forward. Among all my cases, however, I never was obliged to do this. Bending the patient forward, and giving a light slap between the shoulders has been sufficient. In a few cases I have *dashed* a tumbler of water in the face of the patient.

Ether should not be administered until at least two hours after eating a "meal," otherwise vomiting is likely to take place during etherization.

Do not allow your patient to take brandy, or other like stimulants, just before taking ether; it is apt to excite her, and make etherization more difficult. C.

FILLING TEETH.

(*Continued from page* 144.)

Cavities upon the labial or lingual surfaces of the superior incisors are easily accessible, and the approximal cavities of the superior lateral incisors and cuspids may be reached in the same way as those of the central incisors already described. The

bicuspids, however, present some peculiarities that require a special notice. These are most frequently decayed upon the approximal surfaces, and it is probably true that more superior bicuspids, after having been plugged by tolerably good operators, are finally lost on account of faulty operations, than any other class of teeth. This is generally due not so much to a want of manipulative skill as to the adoption of a faulty plan of operations. If the cavities are small and the teeth not too closely set together in the jaw, they may be separated by wedging, so that the cavities may be properly filled, but in a majority of cases it would be exceedingly injudicious to attempt to reach these cavities in this way, though many operators have succeeded in reaching them by chiseling and filing large V shaped openings between the teeth, but the teeth are not only disfigured by this operation but their usefulness is to a certain extent impaired, and as there is no absolute necessity for this mode of practice it is rapidly going out of use, and giving place to a practice more rational and more scientific. This consists in cutting through the grinding surface to the cavity, so that the whole cavity can be easily reached. Thousands of bicuspids and molars likewise are annually lost by attempting to plug approximal cavities by manipulating between the teeth; when by cutting through the grinding surface to these approximal cavities they might have been easily saved.

Although this is by far the most common cause of failure in these operations, another must be here alluded to, which is likewise due to an injudicious mode of operating. Many operators are accustomed to open these cavities from the grinding surface, and when the teeth stand closely together, fill the cavities without separating the teeth. If the approximal cavities are large, the margins are almost certain to be thin and ragged, and it will be impossible to make the margins of the plug perfect; and, moreover, particles of food are very apt to find their way between the necks of the teeth, and the gases and acids engendered by their decomposition are apt to lead to further decay. If the approximal surfaces of the teeth are separated, the margins of the filling may be made perfect, and no lodging place is left for particles of food,

and as far as my observation goes, those operations where these precautions are observed prove by far the most successful. It is important to recollect that when these cavities are reached in this way it is necessary to make the opening from the grinding surface to the cavity of decay of such shape as to ensure the retention of a plug if it is well consolidated—that is to say, it must be dovetailed, and generally this is principally done by small chisels and the mallet, but small files are also necessary to complete the operation, both for the purpose of giving the opening the requisite shape and also for smoothing the surface. In many of these cases, however, the best way to make this opening is to commence with a drill upon the grinding surface, between the cusps of the teeth near the centre of the masticating surface, or perhaps even farther than that from the approximal cavity, and drill obliquely to the cavity of decay, and then by gradually enlarging this first opening by bur drills, the required shape can be given to the opening with little difficulty. In some cases, however, much labor will be required to cut out the dovetailed opening communicating with the cavity of decay, but whether it takes twenty minutes or four hours the desired form should be attained before attempting to fill the tooth. As these directions apply as well to approximal cavities in superior molars as in bicuspids, no separate details in regard to the molars are required. Cavities in other locations upon these teeth are generally easily accessible and need no comments. In the lower teeth, the same general principles prevail, but a few peculiarities may require a passing notice. When the lower molars or bicuspids incline considerably towards the mesial line of the mouth, and, the pulp being dead, it becomes necessary to reach the pulp canal, it is sometimes exceedingly difficult to do so through an opening in the grinding surface of the tooth. In such cases, one may drill boldly through the anterior labial cusp, upon the labial surface, cutting out likewise a small portion of the grinding surface, so that the centre of the opening shall be about the line of junction between the labial and grinding surfaces, by which the anterior pulp canal can be reached usually without much difficulty, the posterior canal generally being the more accessible of the two.

Difficulties will undoubtedly arise, that have not been here enumerated, but the general principles that have been indicated will suffice to overcome a great majority of them, and we hope will be instrumental in removing some of the difficulties that frequently annoy the young practitioner. J.

(To be Continued.)

GOLD FOIL.

(For Students.

Twenty-five years ago the gold most in use was "No. 6." Some practitioners used occasionally much higher numbers, even to "No. 30." The foils then in use were non-adhesive; many used them in long ropes, carrying successive portions of the rope to the bottom of the cavity, until it was filled.

After a while "No. 4" soft foil began to be used, and became the standard number.

When *adhesive* foils took the place of the non-adhesive, No. 4 was the one most used, and it continues to be used by the great body of dentists. In my own practice I have gradually come down to No. 2.

On the recommendation of my friend, Dr. McKellops, of this city, I commenced the use of No. 2 about a year ago, and have for many months used that number, exclusively, for pellets and cut ropes, when I could obtain it. Many dentists in this city use No. 2 altogether. For cylinders I prefer No. 4, as the same amount of gold can be prepared more rapidly with heavy numbers than with light ones.

I think No. 2 has great advantages over the heavy numbers; pellets made of it are exceedingly soft, and weld with less pressure than thicker gold. For *hand* pressure they are exceedingly desirable. A leaf of No. 2 of course contains two grains of gold. If I wish to make very small pellets I cut a leaf into 30 pieces, which makes one-fifteenth of a grain in a pellet. Larger pellets contain one-eighth of a grain, a sheet being cut into sixteen pieces. In cutting up gold for pellets, take five or six sheets

at a time, with the paper leaves between them, and cut the paper with the gold. In this way it will not stick to the scissors.

The square pieces are taken up by the pliers, and rolled between the thumb and finger lightly, making them ovoid shape.

Ropes are made from No. 2 foil, by cutting the sheet into halves, and after rolling the half into a rope, cutting it into from five to fifteen pieces. There is an objection to cutting up adhesive rope in the heavier numbers; where it is cut the edges are welded together, and thus hard and unyielding bits of gold are continually being incorporated into your plug, which you will observe by the *feeling*.

Although the same adhesion takes place in cutting No. 2 rope, yet there is so *little* gold condensed in this way, that its effects are unappreciable, and are not objectionable in *practice*.

Before preparing gold foil for the cavity, the hands should be washed. A clean napkin should lie in your lap, on which you may wipe your fingers very frequently, while *fingering* the gold foil. The excretions from the glands of the fingers should not be incorporated into a "plug."

A nice contrivance for keeping your prepared gold in, is a square or circular box, half an inch high, and five inches in diameter, divided into six or eight apartments. In these separate divisions, I would have small pellets; large pellets; cut leaves, unrolled; cut rope; large cylinders; heavy cut rope, tightly rolled as a cylinder; light cut rope, tightly rolled as a cylinder; unadhesive pellets, loosely rolled, containing from a quarter of a sheet to a whole sheet of No. 2.

These loose *unadhesive* large pellets are very useful in *starting* a plug where there are no retaining points. Let one nearly fill the cavity, then carry a *very small adhesive* pellet right through it to the desired location and condense it. Now do the same in another portion of the cavity. You may go all around the the cavity thus, and soon have a circle of adhesive pellets condensed, without moving the large loose pellet. It acts as an immovable bed, in which you may plant your adhesive gold. A large *adhesive* pellet would *curl up* if treated in this way, and would have to be removed.

Cut leaves are important in filling up *crevices* and in making fresh adhesions, when the *breath* of the patient has condensed on your plug, and injured its welding properties.

Densely rolled cut rope, and cylinders are to be used as directed in a former article on cylinder filling, in the January number of this Journal. C.

THE RUBBER DAM.

Dr. Barnum, of New York, has laid the whole profession under great obligations to him for the invention of this almost indispensable adjunct to the operative dentist.

There are some dentists far removed from the larger towns and from professional intercourse, who probably have never seen the rubber applied or even the rubber. For those I write.

The Rubber Dam is a sheet of rubber as thick as four or five sheets of letter paper, with a hole punched in it, and slipped over the crown of a tooth and pressed down upon its neck. Its close adaptation to the tooth keeps the saliva from coming to the crown.

We have the second bicuspid of the upper jaw to plug on its anterior surface, the cavity extending quite to the gum. From the character of the cavity it will require a long operation. We will apply the *Dam* so as to be sure of dryness, and also for the purpose of allowing the patient to rest when we are half way through plugging, also to rest ourselves. We notice that the second bicuspid touches at its coronal surface the first molar. The first bicuspid touches the canine. We press or drive a wedge between the second bicuspid and molar, and one between the first bicuspid and canine, enough to slightly separate them. The cavity is prepared for the plug previously to this, and therefore we have a space between the first and second bicuspids.

We wish to pass the rubber over the two bicuspids and canine. As there is a space between the canine and lateral incisor we need not wedge them. Let us select the rubber. A thick piece is the best; get the thickest they have at the dental depots. A piece about square, and as large as your two hands will do. We

must have a *Punch* which will *cut out* a piece of rubber, making a hole as large as a large knitting needle. With this we punch three holes about one-eighth of an inch apart, in a row, and about the middle of the sheet. We will now slip the teeth through these holes, beginning either with the second bicuspid or the canine. This is not difficult to do. Press the rubber close up to the gums. Now tie a strong thread or druggist's twine around the canine close to the rubber. Tie one about the first bicuspid also.

Tie one about the second bicuspid, and press it closely, and still more closely, against the rubber, and both so far on to the neck of the tooth that you can see your cavity and know that its gingival margin is free from rubber or twine. Cut off all the loose ends of twine closely, so that they may not be in the way. Wipe out the cavity with spunk, and observe that it will continue to be dry after wiping.

We will attach twine to two corners of the rubber and tie it back of the patient's head: this will prevent it from falling down over the tooth. The other two corners may hang out of the patient's mouth.

We must not cut holes with a knife or punch holes with a pin, instead of using a punch. A certain amount of rubber must be removed from the sheet, and the margins should be clearly cut, otherwise the rubber will tear and will not be water tight.

Thick rubber is better than thin because it does not tear as readily, and it *hugs* more closely about the neck of a tooth.

A tooth treated in this manner will allow the patient to swallow, spit out the saliva; and the dentist to leave the patient to rest himself; prepare gold, &c., and yet not get wet. It may be placed upon any tooth in the mouth. It is particularly valuable for the under teeth, and the molars of either jaw. There are some locations in which it is exceedingly difficult to adjust it. In some localities it will be almost impossible to retain it in place during a long operation without the use of clasps. These are made by Mr. Spackler, instrument maker of this city, and work admirably. They retain the rubber in place perfectly, notwithstanding any *strain* that may come upon it. The strain is greater on the posterior teeth,

and the rubber more liable to slip upon teeth which are not fully erupted or have large necks.

In extreme cases of cervical decay, where it extends far up under the gums, the latter must be dissected up from the tooth, so that the rubber can be applied beyond the most distant margin of the cavity.

Those who have never applied the Dam should commence by putting it on a convenient tooth, one indeed that does not require it; thus they will get accustomed to its manipulation and be able to successfully manage the first *difficult* case they may have.

In my article last month I advocated the use of spunk. I now wish to speak as well of the Rubber Dam as it deserves, if indeed I can. No dentist who has an ambition to surmount obstacles and excel in operative dentistry can do without it. No dentist who has seen it *defy* the saliva of the mouth will be without it.

C.

A NEW OPERATION.

Miss W. came to me with a first left lower molar decayed to the extent that the entire lingual and a greater part of the labial surfaces below the gum were removed. The roots were filled properly with gold, and the crown had been filled several times; the last time the crown was built up, in good style; but the two walls being of such a shape that the filling could not be made self retaining, I took a natural tooth corresponding as nearly as possible in size and shape to its fellow of the opposite side, and imbedded its roots in plaster to make a model from which to get a metallic die over which to swage a gold cap. I used a thin piece of pure gold plate, cutting it at the corners; giving but a slight lap for soldering after it was perfectly fitted to the die. I then fitted this cap accurately to the remaining portion of the tooth in the patient's mouth, allowing it to extend under the free margin of the gum quite to the alveolus, which was about the thirty-second part of an inch below the margin of decay. After soldering a bar across the cap from the lingual to the labial surfaces, it was finished and polished at the lathe. I then prepared

the patient's mouth as usual for filling; made a thin paste of oxy-chloride of zinc; filled the cap, and pressed it to its place; the superfluous cement was crowded out of the cap and removed at the margin of the gum. I had the pleasure of seeing that tooth to-day, nearly four months after the operation, and had the gratification of seeing and hearing it pronounced a perfect success.

X.

SCOLDING.

When I consented to take charge of this department of the Journal, I did not expect to do all the writing for it. I expected articles from various good writers in the profession. The interest of a journal can hardly be maintained without it is the record of the thoughts and experiences of a large number of practitioners in the profession which it represents.

In the first number of the Journal an invitation was given to the profession to come forward and make this a valuable monthly by writing for its pages.

This has been done only to a very *limited* extent, and consequently my "C" has been oftener seen at the end of papers in my department than the readers of the Journal or myself deserve.

I now again request the friends of progress, and of the Journal, to lend a helping hand for the department of "Operative and Surgical Dentistry."

Many familiar truths must be said again and again. It is not expected that one will write what is novel, or not write at all.

But many new thoughts and modes of practice might be recorded to advantage. There are many minor points in operating, wherein one practitioner differs from others, which would be interesting and profitable to put in print.

Cases in Practice are generally eagerly read, even if not wonderful.

Come, gentlemen, you promised to write for the Journal, why don't you?

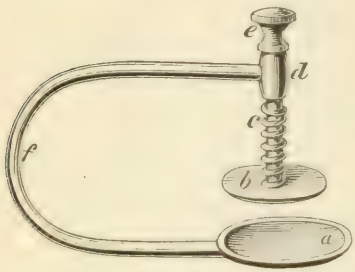
C.

PAROTID DUCT COMPRESSOR.

In the April number of this Journal I spoke of this instrument.

The cut shows it as used by myself, and manufactured by Mr. Spackler, of this city.

It is made of steel, and plated. "a" is a concave cup which is placed inside of the mouth over the opening of the duct. "b" is the corresponding cup which goes outside of the mouth and the cheek against the inside cup. "f" is of spring temper to accommodate the instruments to a *thicker* cheek. "e" is the head of the rod attached to "b," and "c" is a spiral spring around the rod to press "b" against the cheek. "d" has an opening through which the rod plays.



To operate the instrument, place a thick bit of spunk the size of cup "a" over the opening of the duct. Withdraw the cup "b" from its fellow, so as to open the instrument sufficiently, and with one hand slip the cheek between the cups, until the spunk and duct are reached. Now press the cups together a little, and the saliva is effectually cut off.

The price of these compressors is $3.00, for sale by Leslie and Co., of this city.

Dr. Taylor's instrument may be even better than this. I have not tried it. Dr. Taylor informs me that S. S. White will soon have them in market. C.

EARLY DENTITION.

From the Medical Times & Gazette.

M. Guenoit related to the Société de Chirurgie the case of an infant which, when nine days old, exhibited a spontaneous expulsion of the two middle upper incisor teeth, together with the

destruction and expulsion of the dental bulb. There was some gingival stomatitis, but no abscess of any kind. The teeth resembled two solid shells, covered with a thin layer of enamel. These cases are rare. In connection with this subject M. Guenoit enumerated several celebrated persons who are said to have been born with teeth, such as Mirabeau, Mazarin, Louis XIV., to which he would have added that of M. Broca had not this gentleman disclaimed any right to such a distinction. Believing the fact generally admitted, that infants are occasionally born with teeth ready cut, we are greatly surprised to find such an experienced accoucheur as M. Blot utterly denying its accuracy. He says he has never met with an instance of its occurrence in 30,000 infants that have come under his observation, and the experience of his colleagues is just as negative. However, that unfailing repertory of information, M. Giraldes, was enabled to refer to numbers of cases of children born with one or more teeth; and he has met with similar cases in his own practice. M. Besneir observes that such cases are familiar enough to matrons, who are in the habit of at once extracting the teeth. We suspect that this operation must have been already performed in case that otherwise would have attracted M. Blot's attention.

ORAL PREPARATIONS.

Dr. S. S. White has prepared some very elegant preparations for cleansing the mouth and teeth, that are not surpassed. His No. 1 tooth powder, is one of the most delicate and delightful I ever used. Those who do not prefer to prepare their own dentrifices for the use of their patients cannot do better than to keep a supply of this on hand.

His tooth paste is also elegantly put up, and is all that could be desired for those who prefer dentifrice in this form.

Dr. White has also given the profession a tooth soap, as worthn of commendation as the above preparations.

Lastly, to make the dental toilette complete, he has put up in good style a desirable tooth wash, or mouth wash, of a sapon-

aceous character. He has in fact "Astringent;" "Tonic;" "Aromatic;" "Boquet," and "Saponaceous" mouth washes.

Dr. White deserves well of the profession for the liberality with which he has always treated it, and surely he is receiving his reward. He welcomes every invention, from whatever quarter, which is valuable to dental science and art, and is willing to risk his money in it.

Before leaving the subject, I will say a word for a tooth powder bottle, invented by Dr. J. B. Da Camara, a cut of which is seen in the *Cosmos*. It is certainly, in my opinion, the most desirable invention for keeping and using tooth powder ever invented. It avoids waste: preserves perfectly the odor or flavor, and can be taken and used by the traveler, as conveniently as though he was at home. C.

Mechanical and Miscellaneous Department.

ADDRESS

At the organization of the Chicago Dental College, April 27, 1869.
By Professor R. L. Rea.

Gentlemen:—

In the inauguration of an enterprise of such importance as the present, it will perhaps be proper to offer the Board a few words of explanation, giving the reasons, deemed satisfactory, for its attempted establishment. In doing so, it will not be necessary to occupy but a few moments, as I intend to state the facts simply, thinking them so plain as to need little elaboration.

It seems right and proper that Chicago should have a Dental College, first, because in this she should not be behind her usual enterprise in establishing schools of instruction. There is not a single branch of education unrepresented here, except dentistry. We have our universities, seminaries, schools of medicine, law,

divinity and pharmacy, every department of learning represented in our educational institutions except that of dentistry, and it seems but right, that if we are what we assume, present and prospective, that this important branch of instruction should have a representative.

The subject has been agitated for several years, but with such a want of unanimity among the profession as to discourage all attempts at its undertaking. This has grown partly from personal friendships, and partly from the want of them. Many of our influential dentists have had friends connected with the faculties of other institutions, and have lent their influence to them, this being particularly true of Cincinnati and St. Louis. Again, there has been bad feelings arising among our brethren of the other kind, which shows them to be worthy descendants of the parent stock, able to give and take, even where no profit resulted.

This enterprise has grown out of a desire to overreach all petty contentions or ambitions, and place it on a secure, broad and enduring foundation, by ignoring everything except the true interests of the dental profession, for whose especial benefit it is proposed to organize and establish this institution. In accordance with this idea, the present board has been selected, with reference to its enlarged views, its personal interest in the welfare and success of the school, as one of the great interests of our city and the northwest, and with the hope that these ideas may govern all their actions in connection with it.

Another reason for this institution being established is the palpable necessity now existing for a higher standard of dental education. Dentistry is acknowledged and encouraged as one of the specialties of medicine. When one expecting to pursue any of the other specialties of our profession begins his studies, he invariably does so by pursuing a regular course of studies in medicine, receiving his degree, and then superadding the knowledge necessary to qualify him for his specialty. Take the familiar example of the eye and ear; you never see a competent practitioner in diseases of these organs who is not thoroughly versed in the science of medicine, upon which he founds his

special knowledge. So it might be said of diseases of the chest, you cannot make a successful practitioner of this class, unless he study not only diseases of the chest, but every other part of the organism, with all its relations, sympathies and remedies. The same is true of orthopedic surgery, venereal diseases, &c.

It is notoriously true, that a large majority of the members of the dental profession are not only ignorant of the primary and essential facts in medicine, but are allowed to graduate from dental colleges in deplorable ignorance of the principles of medical science, so long as they are able to extract a tooth, and successfully fill a cavity in one. This is not as it should be. It is a great wrong in this branch of education that ought to be corrected. It grows out of the large element of mechanics blended with its practice. The apt and elegant apparatus needed, the perfect and beautiful adjustment of parts occupies so large a portion of the time of the student, that they soon engross his entire attention, and supplant the proper groundwork of anatomy, physiology, pathology, &c. The surgeon, in the treatment of fractured limbs, requires mechanical skill in the preparation of apparatus to secure the fragments, but this avails nothing in telling when constitutional treatment, upon which the cure often depends, is needed, and what that treatment should be; nor does the mechanics of dentistry qualify to diagnose and treat the affections of the teeth, which are often constitutional and need appropriate medical treatment.

It seems to me that it should be the duty of dental colleges to require something more than a simple knowledge of the jaws, a few of their more simple diseases, and how to fill a cavity with gold so that it will remain. They should in all cases possess and be examined with reference to qualifications, as in a medical degree, with the superadded special branches belonging to dentistry. It is one of the strongest reasons for and of encouragement in this enterprise, that we have one such institution in the United States, established two years since, which is succeeding beyond all precedent, and it is with pride we recognize that institution as the pioneer in true dental education, and an address by

one of its faculty (Prof. Peebles) in this city, as the last suggestion needed to give this college its present form.

Another reason, which occurs to me, is the necessity which exists of obtaining a dental education at less rates: the usual fees for tickets being over $100. In the northwest, of which we claim to be the metropolis, a majority of our young men, who have to educate themselves, are illy able to afford this outlay at the proper time, that is while preparing for practice, and once in the profession and engaged in its duties, they become so entangled in business as to render the absence necessary to attend lectures a great sacrifice, and the possession of a proper dental education is postponed, perhaps indefinitely.

The medical college, with which I have the honor to be connected, in view of their responsibilities in connection with the multitudes of self-made men of the northwest, felt it their duty to place their fees at less than half the regular rates, and the hundreds of young men who have been assisted by it in obtaining thorough medical educations, who, without it, would have had either to delay it or been kept from it altogether, attests the wisdom of their decision. I do not think cheapening an education degrades it, unless the standard be correspondingly lowered. This then, it seems to me, should be one of the principles governing this organization, to afford to young men an education at a more moderate rate than it can now be obtained.

Another reason for its starting here and now is, that I think, without speaking from absolute knowledge, it can be organized so as to render the difficulty of obtaining a Faculty comparatively small, by forming a connection with one of the medical schools of their city, and simply adding a corps of four or five instructors in dentistry proper. This would materially decrease the expenditures, a very important item in establishing institutions of the kind, and at the same time give our new school the benefit of whatever reputation the medical college may possess, and in this way much more rapidly give it the needed reputation and support.

It has been for years a source of wonder to me why our dental colleges have been so poorly patronised, a very small propor-

tion of dentists who are practising their profession, being graduates, or have ever attended on lectures. I have now before me a list of six of the leading dental colleges of the United States, and their combined attendance does not equal that of a single medical college of our city. Why this is so I am unable to state, whether from the largeness of the fees deterring students of moderate means, or from the tendency to run to the mechanical part, to which I have alluded, leading them to think a thing purely mechanical can be learned as well at home as at college, and cheaper, practice making perfect, or whether the sentiment of the profession is that of dissatisfaction with the character of the teachings in our dental colleges, I shall not pretend to determine, but that such is the fact the figures I have given most clearly show.

That this institution may so organize and equip itself with such a faculty as to overcome the obstacles, whatever they may be, which have stood in the way of its predecessors is the most earnest and ambitious thought that has ever entered the mind of its originators.

IMPROVED METHOD OF ATTACHING TEETH TO METALLIC PLATES.

By E. Hale, Jr., St. Louis.

From time to time during the past two or three years, the attention of the profession has been called to experiments that were making to work aluminum as a base for artificial dentures.

Some of these experiments promised well, and many were led to believe that the end sought would be attained, but as yet little of success has attended them. Alloys have been suggested as solders, which while they met one indication, that of uniting the parts, they failed in others equally important, they were rapidly acted upon by the secretions in the mouth, and hence were unsuited for the purpose for which they had been suggested.

Dr. Bean's method of working aluminum, which consists in first casting the plate from a model upon which the teeth have

been arranged, and then completing the operation by attaching the teeth to the cast plate, making use of tin as the means of attachment, has not been found practicable. The extra expense, time and skill required to manipulate aluminum as patented by Dr. Bean, prevent the adoption of the process. Doctors Berry and Drake, of Cincinnati, after repeated experiments to cast aluminum after the Cheoplastic method, finally gave it up as impracticable, on account of the shrinkage. I have watched with no little interest the experiments of others, and have made many myself with the view of making use of aluminum as a substitute for the rubber base. I will now give my method of attaching artificial teeth to aluminum or other metallic plates as the result of my labor in this direction and for which I have applied for letters patent.

The impression having been taken in the usual manner, trim the edges preparatory to swedging a rim around the border. Prepare a plaster model in the ordinary manner; with wax raise a ridge one-eighth to three-sixteenths of an inch in height around the arch as nearly as possible on a line with that to be occupied by the lingual surface or border of the blocks.

From the model thus prepared get up the metallic dies as usual. The plate when swedged in the dies thus prepared will have a rim around the border and a raised rim or ridge around the arch on the lingual surface, and a corresponding channel around the arch on the palatine surface; this corrugation of the plate serves a double purpose, that of increasing the stiffness without increase of weight, and the channel the receptacle for the rubber attachment. When the plate is swedged, drill a succession of small holes through the plate on the outside—the side next to the teeth —of this rim; trim up the plate ready for adapting it to the mouth. Carefully remove the wax ridge from the model and place it in the groove in the palatine surface of the plate; warm the plate slightly and press it down upon the model to adapt the wax to the surface of the model; arrange the teeth on the plate in the usual manner; wax up the case, not allowing the wax to extend over the lingual side of the ridge.

Pack, vulcanize and finish up in the ordinary manner. If

properly conducted, this method will ensure a stiff, handsome and durable plate much thinner than rubber can be made, and equally as light and cheap.

Many I know will say, Ah! but aluminum will not resist the action of the corroding agents in the mouth; but I am satisfied that this objection is not tenable. Aluminum has been tested and found to resist the action of all corroding agents found in the mouth. It has been worn constantly two or three years without showing any signs of change.

Doctors Berry and Taft, of Cincinnati, to whom I had the pleasure of demonstrating my method, expressed themselves as highly pleased with it.

Dr. Taft says: "I am very favorably impressed with your improvement in the attachment of artificial teeth to metallic plates. I think it the best I have seen of rubber attachments."

Dr. Berry says: "Having received instructions of Dr. Hale as to his improvement in fastening teeth to aluminum and other plates, and adopted the same in my practice, I take great pleasure in saying that I consider it a valuable improvement, combining lightness, thinness and strength of plate with a secure and reliable attachment of the teeth to the base."

A CASE IN PRACTICE.

By Geo. H. Cushing, Chicago Ill.

Mr. Editor:—

The history of the case of irregularity which you asked me to report, I send herewith, and will endeavor to describe it as clearly as possible. The patient was a young girl of fifteen years of age of decidedly scrofulous diathesis. Had always been a sickly child, and evidence of retarded growth was to be found in her disproportionately slender limbs, as well as in the condition of her mouth. She was slightly under size generally.

When she was first placed under my care, her mouth presented a most singular appearance, as well as a very repulsive one. The

lower jaw was natural as to the eruption of the teeth, though they were slightly crowded, while the arch was somewhat contracted. In the upper jaw, all the teeth were wholly or partially erupted, except the left central incisor. The arch throughout its entire extent was contracted, so that the molars and bicuspids shut within the proper line, just as much as they should have shut over it, that is, the outer cusps of the upper molars and bicuspids, which should have shut outside of the outer cusps of the lower teeth, did shut inside of those outer cusps. The teeth on the left side in the upper jaw, from the molars around to and including the left lateral incisor, were quite regular as to their relation to one another, and the cuspid and lateral incisor shut over the lower teeth. As stated before, the left central incisor had not made its appearance, and the right central and left lateral were within just three-sixteenths of an inch of each other. At this point the alveolar ridge measured eleven-sixteenths of an inch in thickness at a point just above the line of the margin of the gum on the right central incisor. There was a marked prominence over this space between the central and lateral, and extending a little way over each of these teeth, upon the labial side of the ridge, and a somewhat greater protuberance to the right of the median line on the palatal side, then there was on the left of this line. The right central incisor was fully erupted, but inclined from its proper direction, toward the centre of the mouth, so that the root stood toward the root of the canine of the right side, while the anterior approximal side was turned outward considerably toward the lip. The right canine was about one third erupted, and was lying immediately in contact with the right central, while it was inclined from its proper direction just the reverse of the central, so that the roots of the right central and canine must have crossed each other. The right lateral was fully erupted, and lying in immediate contact with the under or palatal surfaces of the right central and cuspid,—equally upon each, and in closing the mouth shut entirely within the incisors of the lower jaw.

The first right bicuspid was fully erupted, and almost touching the cuspid anteriorly on its labial surface and the lateral on its

palatal. The other teeth on the right side were not peculiarly noticeable, except that they struck within the proper line.

The first impression concerning the missing central was in view of the great thickness of the alveolar border, and the position and inclination of the right central and canine—that it was lying across the alveolar border, though there was nothing about the prominences either on the labial or the palatal sides to furnish any satisfactory evidence as to which way the cutting edge was directed. The diagnosis was incorrect, as will appear in the further history of the case.

The first efforts in treating this case were directed to expanding the arch commencing with the molars. For this purpose plates of hard rubber were made to cap the bicuspids, extending over the entire palatine surface. Dovetails were cut opposite the molars into which wedges of soft wood were forced, which were renewed from time to time as was required. After the molars were brought out to their proper places, the same process was pursued to bring the bicuspids into line,—capping the molars and making pressure upon the bicuspids by wedges. Some four or five months from the time of commencing to wear the plates, at the most prominent point on the palatal side of the alveolar ridge just back of the right central incisor, a tooth made its appearance, which from its conical shape and roughness, led us at once to conclude it to be a supernumerary, which opinion we were confirmed in by the appearance on the labial side of a more defined shape in the prominence there, indicating the near eruption of the cutting edge of an incisor. We waited for two weeks for the supposed supernumerary to more fully declare itself, being more convinced of its true character the further it was erupted; yet before removing it I cut down upon the supposed central which was presenting upon the labial side of the ridge, and examined it carefully to satisfy myself that the tooth we wanted to fill the vacant place was there. The examination was conclusive as to its character, and I then removed the supernumerary, which was like most such teeth, only perhaps larger than the average. The molars and bicuspids being at this time in place, we made a new plate, capping both molars and bicuspids, and applied pressure to

the right central and lateral, expecting daily to see the left central push its way through the gum.

This did not occur however, and after nearly three months waiting, we decided to remove the first bicuspid on the right side in order to draw the cuspid down into position. A ligature of silk was forced upon the neck of the cuspid and securely tied, and two or three ligatures cut from rubber tubing tied into the silk. A small gold hook was secured into the rubber plate at the inner side of the second bicuspid over which one of these ligatures was caught. This arrangement enabled the patient to remove the plate to cleanse it at her pleasure. The tooth yielded slowly but surely, and is now nearly in place, but still the central made no progress and we began to think it was time to cut down upon it and screw a staple into it that we might attach a rubber ligature, when one morning she came to the office with a tooth just erupting upon the palatal side of the ridge just under the left lateral incisor, or partly under that and the space which should be occupied by the central. This is evidently another supernumerary, and will in a few days, as soon as it is somewhat further erupted, be removed. How many more there may be standing in the way of the eruption of the central incisor, I cannot say. I shall hope that this is the last. The present condition of the mouth is this: The molars and the bicuspids antagonize correctly; the right cuspid is removed from its close proximity to the right central, almost enough to permit the lateral to come into line, though that cannot be accomplished for some time yet, owing to the direction of the roots of the central and cuspid which converge so much at their apices. The right central I shall not attempt to move until the left central shall come down, where it will be easy to bring it into perpendicular. The space between the right central and left lateral, is more than sufficient to accommodate the left central when it shall make its appearance.

I do not see anything now in the way of a perfect success, though of course it will be some time yet before the necessary operations will be brought to a close. There are peculiar features about this case, which have never before fallen under my observation, and which I do not remember ever to have read of.

The two (and perhaps more) supernumeraries seem to me remarkable in a person of such marked scrofulous habit. The case was certainly a most unpromising one when it was first presented to my notice, though I have never for a moment lacked faith that the teeth could be brought into proper position, if the patient would submit to the necessary treatment. I regret, Mr. Editor, that I could not give a more satisfactory description of this case, but aside from the difficulty of describing such things clearly without casts and drawings, I think neither casts nor drawings, together with a better description than I could write, would give at all an adequate idea of the peculiar appearance which this mouth presented, or make fully apparent the obstacles to be overcome in treating it. I trust some good may come from the history of this case, in encouraging those who are diffident about undertaking such cases, from a doubt about the result, to give a fair trial to persistent effort, before extracting any of the six anterior teeth. I gave no encouragement that any marked improvement (I meant by that such improvement as would seem marked to the patient or her friends) would be apparent under two years. The case has been under treatment about fifteen months, and the patient and her friends begin to see that marked improvement has already taken place. I hope and expect to be able to tell you some time of the complete success of the treatment.

NORTH IOWA DENTAL ASSOCIATION.

The next annual meeting will be held in Dubuque, on the second Tuesday in June, at 4 o'clock, P. M.

Subjects for discussion:

Alveolar Abscess; Dr. E. L. Clark, Dubuque.

Filling Pulp Cavities; Dr. A. B. Mason, Waterloo.

Pathology of Dental Decay; Dr. J. T. Abbott, Manchester.

Salivary Calculus; Dr. J. D. Russell, Vinton.

Filling Teeth; Dr. D. H. Gill, Independence.

Mechanical Dentistry; Dr. C. Poor, Dubuque.

To make the meeting what it should be, all are requested to

come prepared to take part in the discussions, and we earnestly request all members to arrange their business so as to meet with us, and bring their brother dentists with them. To those not already members we cordially invite them to come and join with us. "In union there is strength." Come give your presence, your views, and show you are willing to help "fight the good fight." All that come we are sure will go away benefited, and be more competent to meet their patients in their professional sphere.

J. S. NICHOLSON }
M. D. GOBLE } Executive Committee.

IOWA STATE DENTAL SOCIETY.

The seventh annual meeting will be held at Muscatine, commencing Tuesday, July 20, 1869.

We cordially invite all our professional brethren to be present as we expect a good meeting.

L. C. INGERSOLL, *President.*
N. H. TULLOP, *Corresp. Sec'y.*

MISSOURI STATE DENTAL ASSOCIATION.

The fifth annual meeting will be held at St. Louis, on the first Tuesday (1st) of June, 1869, commencing at 10 o'clock A. M.

The special subjects of discussion, to which essayists were appointed at the meeting held in June, 1868, are as follows:

1. Alveolar Abscess: G. S. Shepard, R. C. Mowbray.
2. Atrophy of the Teeth: J. W. Matthews, Charles Henry.
3. Tumors of the Mouth: H. Barron, E. Hale.
4. Diseases of the Sinus: F. C. Brewer, R. J. Porre.
5. Ossification of the Dental Pulp: H. Judd, H. J. McKellops.
6. Cleft Palates: W. H. Eames, W. N. Morrison.
7. Mallets and Mallet Pluggers: I. Forbes, G. V. Black.
8. History of Dental Calculi: H. S. Chase, J. C. Goodrich.
9. Professional Ethics: H. E. Peebles, Jas. O. Price.

Recognizing the fact, that it is to associations and meetings of this character that the profession is indebted for its great advance during the past few years, the Committee issue this circular in the hope that the attention of the members being thus called to the subject, they will, if possible, be present and contribute each his share to make the occasion one of interest and profit.

All are cordially invited to meet with us and take part in the discussions.

I. Forbes,
R. J. Porre,
F. C. Brewer,
} *Ex. Committee.*

CHICAGO DENTAL COLLEGE.

The incorporators of this institution held a meeting on Tuesday evening, April 27th, and elected the following gentlemen as a board of trustees:

Hon. Thos. Drummond; Hon. Jno. B. Rice; Hon. Francis Munson: Hon. E. B. McCagg; Rev. Robert Collyer; R. L. Rea, M.D.; R. C. Hamill, M.D.; Geo. H. Cushing; Saml. B. Noble; Geo. S. Bowen; Horace White; Geo. Hibben; H. N. Town; Lewis C. Ellsworth.

Upon organization of the board, the following officers were elected:

E. B. McCagg, President: Robert Collyer, Vice-President; Saml. B. Noble, Secretary.

By-laws were then adopted, and Drs. R. L. Rea, R. C. Hamill and S. B. Noble were appointed a committee on faculty and building.

TO SUBSCRIBERS.

The Journal is mailed regularly and promptly on the 15th of each month to every name appearing on our list. Any subscriber not receiving the Journal in due time will please notify us of the same.

The Missouri Dental Journal.

A MONTHLY RECORD OF THE SCIENCE.

VOL. I.] JUNE, 1869. [No. 6.

From The St. Louis Medical Reporter.

LEUCOCYTHÆMIA.

A case occurring in the Medical Clinic of P. Gervais Robinson, M.D., Professor of Clinical Medicine and Pathology in the Missouri Medical College.

Antecedent History. Nov. 16.—Wm. Sweeney, an Irishman, aged 30 years, single, a laborer, was admitted into hospital. October 10, for malarial fever, which assumed the remittent type.

His father died of chronic diarrhœa. His mother, from his account, died we presume of spanæmia, or at least of some dietetic disease. Three brothers died of low nervous fever.

He himself has generally enjoyed good health until this spell of sickness, the beginning of which he dates about fourteen months ago. He was at that time at work on the Iron Mountain railroad, in a region of country known to be malarious. The weather being very hot at the time he was first taken sick, he indulged freely in bad water, and had a sudden attack of jaundice, followed by fever (malarial), which has frequently recurred up to the present time.

He presents the appearance of having been long under the influence of malarial poison. The sclerotics are jaundiced, and the cutaneous surface generally of a pale yellowish shade. He is much emaciated. The abdomen is somewhat puffy, and on palpation a small quantity of fluid is discoverable in the peritoneal cavity. On the left side the spleen, immensely enlarged, is quite visible to the eye, and is *seen* to descend into the iliac region, presenting an exceedingly irregular border and an un-

even surface, with several prominent points or nodulations. On palpation this condition of the organ becomes more evident, and the nodulated points give somewhat the sensation of fluctuation, so that there might be cause to suspect pus. Pressure gives little or no pain, although the whole organ *has been* quite painful to the touch. The liver is also enlarged, its border being easily felt below the ribs, and is at the same time quite tender to the touch. There is pain about the umbilicus on deep pressure. The inguinal glands are somewhat enlarged and abnormally sensitive. Œdema about the feet and ankles. Has frequent nasal hæmorrhages. Pulse 100 beats to minute, and more *corded* than natural. Heart beats regular: but there is a murmur with the first sound, which can be heard also in the subclavian vessels; temperature 99° F.: respiration slightly accelerated: has an occasional cough, with no expectoration: physical examination of lungs negative: tongue is clean, but very pale, as is also the whole mucous surface visible: much thirst: appetite poor and capricious, constant diarrhœa, from eight to ten actions in twenty-four hours: stools dark and watery, but not offensive: urine dark, like porter: chemical examination shows nothing special. He complains of no pain while he lies quiet, but only a feeling of weakness: intellect clear: sleeps only tolerably well at night, and dreams frequently, waking with a start: has occasional headache. The spleen was explored five days since with a needle at one of the prominent points, on the supposition of abscess, but the result was negative. The blood drawn from the finger, by pricking with a lancet, is exceedingly pale and watery: indeed, looking very little like the healthy fluid. Under the microscope the red discs are found to be diminished in number: do not readily arrange themselves in piles, and become rapidly shriveled and corrugated, while the white corpuscles are enormously increased in proportion; being about one to five or six red. This patient has been taking for some time a combination of quinia and iron. I now suggest that a small proportion of strychnia be added to the quin. et ferr. pills, and that in addition to a liberal diet he should take freely of cod liver oil and whisky.

I propose to call your attention this morning, gentlemen, to the case of Wm. Sweeney, which is an illustration of a *rare* form of disease, or at least of one which has so recently been classed among the "ills that flesh is heir to" that, doubtless, its existence often escapes detection, and *even suspicion*, from want of familiarity with the relation which may exist between certain hitherto unexplained phenomena and a peculiar condition of the blood from which the disease takes its name. I refer to that affection which has been termed leucocythæmia by Bennett, white-cell blood: leucos, cytos and aima, and leuchæmia, white blood, by the great German pathologist, Virchow.

You have visited this patient with me on several occasions, and you will remember that I was inclined on the first examination to give a diagnosis of leucocythæmia, basing my opinion on the general aspect of the patient, and the evident hypertrophied condition of the lymphatic glands, regarding the spleen, as we may now do, as one of these. I, however, advised that we should withhold a positive expression of opinion until we had brought the microscope to bear upon the matter; and the result of such examination has been, as you have heard from our notes of the case, confirmatory of the supposed disease. I now place under the field of the instrument some of the blood of this patient, which you saw me take but a few minutes since from his finger, and you will observe its appearance to correspond with that described in our notes. It is so wanting in color as to be almost creamy, only more watery: and under the magnifying power you see the red corpuscles slowly and lazily approaching one another to form into rows or piles, while here and there you see the white corpuscles isolated, or even in twos and threes together. How very unlike healthy blood you may readily perceive by observing for an instant this other specimen of blood, drawn from the finger of one of the class. In this you find no white corpuscles at all: not because there are none present, but because they bear so small a proportion to the *red*, which constitute the mass of the coloring material of the circulating fluid. If you continue your search for a few minutes you will probably find a few here and there: the normal relation of the white to the red

being estimated, you may remember, at about one to three hundred. I think, then, you will be satisfied, from this ocular demonstration through the microscope, of the peculiar condition of the blood which exists in this patient: and when we consider the symptoms and the evident enlargement, or hypertrophy of the lymphatics, you will concur in the diagnosis given of leucocythæmia.

Now I would, in the first place, remark, that a simple increase of the white discs in the mass of blood can not be considered as sufficient evidence of the existence of this disease, since we may have a temporary condition of this kind dependent upon some transient cause of irritation, or we may, perhaps, say stimulation. This Virchow terms leucocytosis, in contradistinction to leucocythæmia, which is a more permanent morbid state of the blood, constituting a grave form of disease, and which has thus far been uniformly fatal.

A *permanent* alteration in the character of the blood, with increase in the white discs, appears from recent observations to be connected with and dependent upon a hypertrophied state of the lymphatic system of glands, and more particularly the spleen: at least the connection between enlarged spleen and white-cell blood has been most frequently observed. Now, the more recent results of physiological investigation teach us that the lymphatics have much to do in the manufacture of the white corpuscles, and the spleen being now regarded as one of this system of glands, its hypertrophy is attended with proportionate increase in its function, where such hypertrophy involves the pulpy portion of the organ, as well as its fibrous structures. We have unquestionably very frequent examples of enlarged spleen unaccompanied by any appreciable leucocytosis; and in these we must suppose, until further investigation in this direction shall determine the question more definitely, that the increase in the size of the organ has been due simply to frequently recurring attacks of engorgement, in which the spongy structures have been filled with blood, and the fibrous parts or frame-work of the organ so frequently stretched that their elasticity has been diminished, and their contractility more or less

completely destroyed. This condition of the organ is most commonly seen as one of the consequences of malarial poisoning, and constitutes the familiar ague cake of fever and ague regions. We not unfrequently observe a peculiar cachectic appearance of such subjects existing with this enlargement of the spleen, and special indications of an impoverished and vitiated state of the blood, as for example, dyspeptic troubles of various kinds; disturbances of the circulating, absorbent and nervous systems, as exhibited by palpitations, anæmic murmurs, dropsical collections in the cellular tissue, generally, as well as within the various cavities, and neuralgic pains from time to time. It is very likely that, with a greater familiarity with the use of the microscope and a more thorough investigation of the blood of such patients, we will find leucocythæmia to be by no means an uncommon disease. The history of the case under consideration points to the malarial poison as the real cause of disease; and we have seen that this patient's system was so thoroughly impregnated by this mysterious poison that the usual remedies have completely failed to prevent a recurrence of the attacks of fever from time to time. Our patient has suffered the ordinary consequences of continued chill and fever; viz.: impairment of nutrition and impoverishment of the blood, as the result of such defective nutrition. But we may conjecture that in this case the "materies morbi," which we call malaria, has had, besides its ordinary disturbing influences upon the system, a special and irritating effect upon the lymphatic glands, producing, whether by stimulation or otherwise, an hypertrophy of their functional parts, and so leading to hypersecretion, or, perhaps, to speak more correctly, to increased and excessive manufacture of white cells. It would appear reasonable, then, that in the case under consideration we might regard the malarial poison as the remote cause of the peculiar condition of blood which exists in this patient, and the enlargement of the lymphatic glands the immediate cause or source of the vastly increased proportion of white corpuscles; that is, provided we accept the opinion that it is this system of glands whose function it is to manufacture the white discs. It occurs to me, however, that, admitting the function of the lym-

phatics as stated, and that by hypertrophy this function is increased, still we have only a partial and not at all satisfactory explanation of the condition of the blood in leucocythæmia: since, while we have the white corpuscles very numerous, the red discs are at the same time much diminished, not only relatively, but in the aggregate. How may we account, then, is the question, for the scarcity of red corpuscles? The most generally accepted opinion is, that the red corpuscles are the product of the white globules when these have arrived at a certain stage of development: not by simple transformation: not by any change in form, size or color of the white globules themselves, as probably occurs in some of the lower order of animals, but by a liberation of the *nuclei* of the *white discs*, which nuclei derive coloring matter in some, as yet unknown, part of the body, and thus become the red corpuscles of the circulating fluid. It is by a comparative study of the blood in the lower animals—as the frog, for example—and in man that this conclusion is arrived at as to the probable source of the red discs: since in the blood of the frog, the animal cited, we observe the red corpuscles retaining its nucleus and size, while in man the red globule is a simple cell, and of much smaller size than its parent the white. Now, if this hypothesis be true as regards the origin of the red corpuscle, we must conclude that the accumulation of the white corpuscles is due to two causes, acting in concert. First, to a hypersecretion or excessive manufacture from hypertrophy and proportionately increased function of the lymphatic glands; and, secondly, from arrest in development in the white corpuscles themselves, by which their contained nuclei do not arrive at the proper or required state of life, are not liberated, and do not become red blood: in other words, there is an excessive manufacture of white corpuscles, which remain white cells, while no more, or at least very few, red discs are born from the mother cells.

I simply here advance this idea as one which occurs to me to offer a more complete explanation of the manner in which we have such an accumulation of colorless cells in the mass of the

circulating fluid. To establish this theory and to convert it into a fact will require further and repeated observations.

You must remember in your investigations with the microscope that there exists a very great similitude between the white blood cells and pus corpuscles: indeed, the most expert microscopists can not distinguish them under certain circumstances, and hence such similitude may lead to erroneous conclusions. Suppose, for example, when, a few days ago, Dr. Clark plunged his exploring needle into the spleen, expecting to find pus, he had placed some of the fluid so drawn under the microscope without the previous knowledge of the apparent identity between white blood cells and those of pus, he might have concluded the supposition of abscess to be correct. Such conclusion would have been corrected by examination of the blood from any other portion of the body.

Jan. Gentlemen: you have all visited with me, from time to time, Wm. Sweeney, who has furnished us an interesting example of leucocythæmia; and if you have watched his case you have seen that from time to time his condition has varied a little, being on some days apparently a trifle better, but on the whole he has gradually got worse, no medication appearing to have the slightest tendency to arrest the disease, until, by gradual exhaustion, life has been extinguished.

I now show you the spleen which was taken from his body several hours after death. I may, however, first remark that, on opening the thorax, the lungs were found to present no evidence of disease, if we except the great pallor which simply coincided in that respect with the appearance of all other structures in the body. On cutting into the heart, its cavities were found to be filled with fluid approximating pus in appearance, with a faint reddish tinge, undoubtedly due to the red coloring matter of the blood; no coagula were formed. The liver was exceedingly pale and somewhat enlarged. But the organ most worthy of notice is this which I show you, the spleen, and which you had all satisfied yourselves during the life of the patient was very much enlarged. You will appreciate how much so it is now by comparing it with one in normal condition,

when I tell you that this weighs between five and a half and six pounds and the healthy organ about eight or ten ounces. You observe now upon its convex surface those nodulations, quite numerous, which could so easily be felt during life, even seen, through the walls of the abdomen; they are quite distinct, too, in their color, differing from that of the organ generally, being much darker, and presenting the appearance somewhat of ecchymosed spots. The whole organ feels hard to the touch, and of much firmer consistence than natural. On making a section you see that its texture is much more condensed and firm than that of the organ in a healthy state, and that it looks almost exactly like a piece of liver, at the same time that the pulpy substance is much paler than natural; and, what is quite remarkable and unusual, we have here running along the *hilus* and occupying the site of the ridge sometimes found in this part of the organ, a mass of *bone* enveloped by the proper fibrous coat of the organ: quite a large bit of bone it is, too, being about two inches long, a third of an inch wide and about an eighth thick. Not uncommonly we have ossification taking place about the fibrous structures of another organ, as the valves of the heart or in the arteries themselves, but I have never met with the same phenomenon in the spleen. Now, we subject a small quantity of the pulpy substance to microscopic examination, and we find it to consist mainly of a mass of white or colorless corpuscles, with only here and there a colored disc and some granular matter. As shown by the microscope, the spleen pulp usually consists chiefly of rounded granular bodies about the size of blood corpuscles, and, like them, of a reddish color. The prevailing element here found resembles more the corpuscle found in the malpighian bodies, very like the chyle corpuscle in size and color.

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CHEMISTRY OF A LUMP OF SUGAR.

By Jas. R. Nichols, M.D.

A remarkable substance is found in the juices or sap of plants, which, when placed in the mouth, or when brought in contact with the nerves of taste, produces a "sweet" sensation. This is sugar. It has been stated that the human organism is capable of producing sugar, and that it is secreted by the liver in considerable quantities. We believe that hepatic sugar is not produced directly by that organ, but that it secretes a substance, which, when exposed to the air, changes to sugar instantly. Vegetables alone seem to have the power of manufacturing this most interesting and important substance. A lump of sugar is *sweet:* a lump of salt is *pungent* or *bitter:* a lump of cream of tartar, *sour:* why this difference in substances so much alike physically? The substances are all colorless, resemble each other in crystalline structure, they cohere together in a similar manner, and are about equally soluble in water. Chemistry reveals to us the simple fact, that in the construction of these bodies different elements are employed, and the grouping of the atoms varies considerably: and this is all the information it affords. How different nerve sensations are produced, neither chemistry nor any other science is capable of informing us.

Sugar, in its chemical constitution, presents many features so remarkable they cannot fail to attract the attention and excite interest in the mind of every intelligent reader. The most striking relate to its molecular construction, and the instability or antagonisms which exist among the atoms. An atom of sugar may be compared to the main spring of a watch wound up to the highest point attainable. In this state it represents force under the restraint of agencies which it seeks constantly to overcome. The cog and balance wheels maintain the tension and hold it in place: the slightest slip or disarrangement in these, and the complication of wheels is set to whizzing, and the machinery soon

runs down to an inactive, passive state. Thus it is with an atom of sugar. It is like a coiled spring, ready, from any slight disturbing cause, to run from its highly organised state down to dead, inorganic matter. Heat and acids disturb its molecular arrangement most readily, and form from it a variety of new substances. Place a little sugar upon a thin plate of metal, and hold it over the flame of an alcohol lamp: what a marvellous change occurs! The white crystalline substance begins to fuse, bubbles up, emits smoke and combustible gases: and finally, when the action subsides, there remains a black, crispy mass of charcoal, in every respect like that which results from the combustion of wood. From whence comes this charcoal? It is not derived from the air: it is not supplied from the heat. It exists in the sugar, and is only developed by the agency of heat. Paradoxical as it may seem, beautiful white sugar is largely made up of black carbon: but its color is hidden so that we cannot see it, and this brings us to consider the chemical nature of a lump of sugar. Sugar is a ternary compound: that is, one made up of three elements,—carbon, hydrogen, and oxygen. There are three prominent varieties or kinds, which differ not in elementary constitution, but in the proportion of the atoms, or in the method of grouping the atoms.

Cane sugar, or sucrose..... $C^{12}H^{22}O^{11}$
Fruit sugar, or fructose..... $C^{12}H^{24}O^{12}$
Grape, or starch sugar, glucose..... $C^{12}H^{24}O^{12}H^{2}O$

The difference between the sugars will be seen at once from a glance at the symbols and figures. Now this seems very slight, and yet they are quite dissimilar in effects. The three kinds mentioned are not the only ones known, as three or four others have been already distinctly pointed out. One kind of sugar abounds in the sugar-cane, in beet-roots, and parsnips; this is the sucrose. Another kind constitutes the sweet matter of all kinds of fruits; fructose. Another is prepared by acting upon starch with acid: this is glucose. A fourth is found in certain fungi: a fifth in manna, which is an exudation from a species of ash, *fraxinus ornus*, common in southern Europe. Our meadow and upland grasses contain a sweet substance, which is

probably cane sugar; and it is to this that much of the value of these plants as food for cattle may fairly be attributed. In the laboratory of the plant, cane sugar can be changed into fruit or grape sugar, and back again, with apparently the greatest facility; but this we cannot do in our working laboratories. We can change cane to fruit sugar: but we cannot move a step in the other direction. The chemist or discoverer who invents a way of changing grape sugar or starch sugar into sucrose or cane sugar, with facility, will confer great benefit upon the arts, and immortality upon himself. It is doubtful if this is ever accomplished. Fruit sugar must be regarded as intermediate between sucrose and glucose: and glucose ultimately results from the action of acids, heat and ferments upon all other forms of sugar. In all the chemical transformations involved in changing one sugar into another, no other elements but those of simple water are assimilated or used. How extraordinary is this fact! The sugar-cane furnishes immense quantities of sucrose: in fact, it stands first among the sources of supply, and beets come next. It is singular that a rank, reedy cane and a soft, pulpy root should supply sugar identical in composition, and in the largest quantities. Cane sugar is the sweetest of all the varieties, and it is distinguished for the readiness with which it crystallizes. The crystals are four-sided prisms, with rhomboidal bases, and are remarkably uniform in appearance. This is an article of luxury, rendered by habit almost a necessary of life to every class of the community, and it is consumed in vast quantities. Fruit changes to glucose, and from this a peculiar kind of crystallization may result. Glucose is now manufactured in immense quantities in France, and to some extent in this country. It is recognised in commerce as a beautifully clear, heavy syrup, of a moderate sweetness, somewhat resembling glycerine, and is sold at a low price. It is used by confectioners, brewers and distillers in their various manufactures and operations, but scarcely at all for domestic purposes. It is also undoubtedly used to adulterate the cheaper kinds of refined sugars, although the writer has never met with an instance of this kind of sophistication. It is made from potato starch, by the action of oil of

vitriol or sulphuric acid. Thick, gelatinous starch is placed in a large clay or porcelain lined vessel; dilute acid is added, and the mixture boiled for several hours. The acid is then removed by chemical means, and the solution is evaporated to a thick, heavy syrup; for, by the action of the acid upon the starch, it has been changed into sugar. Starch sugar and the sweet principle of grapes, when solidified, are regarded as identical. If we evaporate the starch syrup down to a point of great density, it will, in a few days, solidify into a mass of grape sugar, weighing more than the starch used in its manufacture. These are, indeed, curious transformations: but still more curious is the fact, that the acid undergoes no change whatever. It is all withdrawn in its original amount after the boiling is completed: nothing is absorbed from the air, and no other substances but dextrine or grape sugar generated. The limits of our paper do not permit us to explain the nature of these wonderful chemical changes.

The value of sugar depends upon its degree of sweetness; and as cane sugar excels in this particular, it is the most valuable. There is a popular notion, that some pure sugars are sweeter than others, or "go farther," as the phrase is. This is an error. All specimens of cane sugar of equal purity are equally sweet. The apparent difference arises from physical causes, or from the different form and size of the crystals. The sensation of sweetness depends, in a measure, upon the rapidity with which the crystals dissolve in the mouth. Fine sugar is regarded as sweeter, because it dissolves faster than the large grained. A spoonful of the latter variety weighs less than the former, as the interstices between the grains are larger, and consequently the fine will sweeten a larger amount of liquid, because there is a larger amount of sugar in the spoon. As a general rule, it is poor economy to purchase impure sugars for household employment. In purchasing the damp, dark sugars of commerce, much moisture and molasses is purchased at a high price; and although they seem sweeter and cheaper, such is not really the case. The process of refining is now carried to such a perfection, and at small expense, that the margin of cost

between the pure and impure sugars is not worth considering.

The term "strong sugar" is often used by refiners, and has a meaning not well understood by grocers and consumers. The meaning is not that one kind of rough sugar is sweeter than another, but that it has a better grain, and is therefore more profitable to the manufacturer. The refiner does not care so much about the color of the sugar he purchases as he does about the distinctness of crystalline structure. The color he can remove; but if a large portion of the sugar is composed of molasses or uncrystallizable sugar he is subjected to loss. Consumers of dark, coarse sugars are not generally aware of the fact that, beside the other impurities, they contain large numbers of the most disgusting insects—the *acarus sacchari*. This insect is a near relative to the *acarus scabiei*, which produces the uncleanly and unpopular affection called the "itch." Indeed, the sugar insect often produces upon the hands and arms of grocers pustular eruptions, resembling true *psora* or *scabies*. These insects burrow beneath the skin, and deposit their eggs, creating much irritation and an intolerable itching. The number of acari found in raw sugar is sometimes exceedingly great, and in no instances is the article entirely free, either from the insects or their ova. Dr. Hassall examined one specimen, in which he estimated no less than one hundred thousand existed in every pound of sugar. In ten grains' weight he counted five hundred, many of which were so large as to be seen by the naked eye. He observes, "that it is inconceivable that thousands of these creatures can be introduced into the human stomach without serious endangerment to health;" a suggestion which will naturally occur to the mind of every reader. The insect is never found in refined sugars. We intend to present to our readers an engraving of the acari, greatly enlarged from the microscopical figure, in a future number of the *Journal*.

Operative and Surgical Dentistry.

HOW TO APPROACH APPROXIMAL CAVITIES.

A very important point in the preservation of the teeth, is to determine how to approach a cavity of decay. Upon the method adopted depends in a great measure the success of the operation of *plugging*.

INCISORS AND CANINES

When these teeth touch each other, and the cavities are small, or what are termed "pin head" cavities, they should be wedged apart, either gradually or immediately. I consider rapid wedging the safest and best in most cases. There is less inflammation than by the long process. "How to wedge" may be the subject of another article. The above case should not be filed to get room. After the separation is accomplished, so far as wedging will do it, if there is still insufficient room for the manipulation of instruments, we must cut through either the labial or lingual surface. Sometimes we may with a small crescent drill open the lateral surface on the labial side, penetrating to the cavity of decay. If the opening we make is no larger than a pin's head, it cannot be considered objectionable to the sight. The diameter of the opening made should be about equal to that of the cavity of decay, otherwise the latter may not be thoroughly filled with gold.

If the cavity is larger than a pin's head, and is nearer the palatal wall, then this wall may be cut directly through. With our present manipulation of adhesive gold we need not hesitate to remove the wall of a tooth if it is in our way of approach. The true way to treat difficult cavities, is to change them to *simple* ones if possible.

Many pretty good practitioners seldom fill from the palatal surfaces of these teeth, because they "can't see." There is no need of breaking one's back in this operation. Elevate the chair

seat to its highest point, and then tip the chair back. The head should be dropped short back also. Nearly all the dental chairs are too low, if set on the floor: they should be set on a platform, at least six inches high, unless the operator is about "five feet four."

BICUSPIDS.

Decay in the anterior approximal surface of the first bicuspid may be high up, near the margin of the gum. If not much decayed, it should be approached from the palatal side, as the bevelled form of the canine will generally allow one to see nearly the whole of the anterior approximal surface of the first bicuspid. If canine and bi. touch along their buccal surfaces, they may be filed apart with Froid's No. 1, for the purpose of polishing: provided the extent of the decay towards the buccal surface impinges against the canine.

The principle should be kept in mind to *always* leave a plug thoroughly polished, about *all* its margins.

If the decay extends to the enamel on the grinding surface of the bicuspid, then it will generally be best to cut through this surface pretty freely, leaving it dovetailed, for the purpose of more securely retaining the plug.

BETWEEN THE BICUSPIDS, near the gum, we often find a small cavity. If the teeth are so shaped that their necks are much smaller than their bodies, and there is consequently a space between them at this point, covered by the gum, their bodies being in contact nearly their whole length, then it will be best to cut out that V shaped bit of gum nearly or quite up to the alveolar process. If the tooth must be plugged at this sitting, cauterise the gum and proceed to open the cavity. If there is no hurry, then pack cotton and sandarach gently into the space made and wait three days for the wound to heal. With small hoes and hatchet we can open the cavity.

Do not use the file in *this* case. If you should separate with a thin file, and polish, these teeth would antagonise again and decay would surely ensue.

It is often necessary to cut a channel in the sound tooth for some distance before reaching the cavity, if it is small, and the

teeth touch, or nearly so, all the way up to the alveoli. This channel should be slightly undercut along its sides.

If the bicuspids are decayed so much that we operate through their grinding surfaces, and the teeth are in contact the length of their crowns, they should be filed apart with No. 1 or 2, Froid's, so that they can be well finished on their approximal faces.

Sometimes cervico-approximal cavities in the bicuspids are nearer the palatal surfaces of the teeth than their buccal surfaces. In these cases, we should endeavor to operate from the palatal side. In some cases these cavities cannot be reached from that surface. If they cannot be reached in any of the ways already described, then a V shaped opening must be made between the teeth, and the cavities plugged from their approximal surfaces.

I consider this a very objectionable mode of operating, however. Much tooth-bone is sacrificed, the teeth are disfigured, and the patient subjected to the annoyance of pressure on the gums from food being *crowded* between the teeth.

MOLARS.

Anterior cervico-approximal cavities on the first or second molars, if small and not in sight, may generally be reached by the crescent drill, and a channel made to the cavity, more or less through sound bone. These plugs can generally be well finished without filing the teeth apart. Wedging at the central part of their crowns will usually increase the space at their necks. If a small cavity is near the central portion of the crown on the approximal surface, Froid's No. 1 or 2 file may be used to separate the teeth, unless the same amount of space can be obtained by using wedges at the necks, and near the grinding surfaces. Abrasion of the enamel is to be avoided, even if it is to be well polished and burnished afterwards. Of course, no one would neglect this operation, after using the file, anywhere.

If the cavity reaches the enamel on the grinding surface of the molars, it should be cut through and plugged from that surface, in a dovetailed slot.

Posterior cervico-approximal cavities of the molars are some-

times hard to reach from their buccal surfaces. In these cases we may drill from the grinding surface of the tooth *near* its approximal surface directly up through the whole length of the crown until the cavity of decay is reached; then cut out that portion of bone between the canal made and the approximal surface, and with delicate chisels pare the edges up to the cavity of decay. Now separate with Froid's No. 1, unless there is space to be had by wedging. This cavity should not be plugged with wedges remaining between the teeth, as the plug would be likely to have imperfect margins at the points where the wedges crossed the cavity.

Not long since I plugged a posterior cervico-approximal cavity, which could not be found by the smallest excavator, but the character of the decay being very black it faintly showed through a thick mass of dentine and enamel on the grinding surface. It had caused constant uneasiness until plugged. It was approached in the way just described. C.

HOW TO WEDGE.

The use of the file in the preparation of cavities, is limited to a much smaller number of operations than formerly. Wedging has taken its place to a great extent, and with remarkably good results. The unsightly V shaped spaces between molars and bicuspids are not as common now as formerly. In only rare cases are these openings *now* admissible.

TO GET ROOM BETWEEN THE CENTRAL INCISORS.

If the cavity is cervico-approximal, drive a wedge of orange wood or hickory near the gum. Now drive one, wider than the former, between the crowns. After these have remained a few minutes another may be driven between the crown wedge and the approximal surface of one of the teeth operated upon. The cervical wedge is now loose and a thick and narrow one may be driven in its place to remain during the operation of plugging. If other teeth are to be filled, operations may be commenced upon them, and time allowed for the wedge to swell and the teeth to

separate. In this way a great deal of space may often be obtained, even when all the incisors are in contact. If there is already space between the lateral incisors and canines we may wedge between the lateral and central incisors first and then wedge the centrals.

CAUTION.—There is more *danger* of wedging between the centrals than between any other teeth in the mouth. Especially in *young* subjects is this the case. For it must be remembered that there is a suture between the palatal bones in the median line, which may be forced open, and grave consequences ensue.

Frail teeth must be tenderly treated, and softer wood used than when the teeth are stronger.

Wedging may be applied to the molar teeth by using hickory, and cutting the wedge half off before driving it; for the portion to be driven can be bent at an angle and thus made to enter the place desired, when a straight stick could not be.

Many practice the slow process, using cotton, rubber or wood, removing the wedge every day or two.

My experience is in favor of rapid wedging. By the slow process there is often a great deal of pericementitis and periostitis, which of course must be combatted with appropriate remedies.

By the rapid process there is some immediate pain, but it passes away even before the wedges are removed, and any slight soreness of the teeth afterwards may be removed as in the former mode. Tincture of arnica may be applied to the cervical portions of the teeth after the wedges have been removed, and thus come in direct contact with the periosteum of the alveolar process, and the pericementum.

Two or three small doses of mercury, say a fiftieth of a grain each, will be useful in case there is inflammation of periosteal tissues from either mode of wedging. C.

FILLING TEETH.

[Continued from May No.]

The directions already given will suffice for a great majority of cavities that will be met with; but some will be found in unusual locations, that must be approached according to circumstances. Cavities are sometimes found upon the approximal surface of lower molars or bicuspids, at or even under the margins of the gum, with a thick plate of tooth substance between them and the grinding surface, so that the process of cutting down from the grinding surface to reach them is exceedingly tedious, and if the dentine is very sensitive, quite impracticable. If the cavity is located near the line of junction of the labial and approximal surfaces, it can not infrequently be best reached by cutting through the labial surface, when the cavity can be reached without difficulty; but if the cavity is small and near the centre of the approximal surface, the difficulties will be increased, and if the tooth be too sensitive to allow of drilling to it, it presents one of the most difficult cases that one meets with, to reach so as to be able to insert a perfect plug, and the operator must be content to operate with fewer facilities and less room than he might reasonably desire; but if he takes great care in properly shaping the cavity, and gains what room he can by filing and wedging, he may generally succeed.

The next important point to be considered is, how to shape a cavity.

It is very common for writers and speakers upon this subject to condemn undercuts in preparing cavities for filling; but this needs some explanation, or the young practitioner might be misled by these broad general statements.

If one has to deal with a cavity upon the grinding surface of a molar, the opening through the enamel is generally much smaller than it is after it has reached the dentine, and the sharp shoulder under the enamel cannot be properly plugged, except with great difficulty, without cutting away the enamel sufficiently to make the opening through it nearly or quite as large as the cavity is

in the dentine beneath it: therefore such undercuts as these that cannot be reached by direct pressure of a plugging instrument are for the most part inadmissible, but we must not therefore conclude that all undercuts are inadmissible. If we have a cavity in the grinding surface with perpendicular walls on all sides, we are told to cut transverse fissures upon the walls, in order that the plug may be retained. Now these fissures or mere scratches across the surface of the perpendicular wall are undercuts, and are indispensable in cavities with smooth perpendicular walls, and when the walls are not smooth or regular the rugosities and irregularities of the walls form the conditions necessary for the retention of the plug, according, in reality, with the same principle as when these undercuts are made with the excavator for this purpose. The principle that should be kept in mind in regard to this question is this: that no undercut is particularly objectionable that can be reached at all parts, and especially upon all of its walls, by an ordinary plugging instrument, whilst every cavity should be so shaped that it will firmly retain a plug if it be well filled and thoroughly consolidated. I will remark here that in cleaning and adapting cavities the first requisite is as perfect an anatomical knowledge of the various classes of teeth as it is possible to acquire.

No one is fit to cut upon a tooth before he has made a sufficient number of dissections of the various classes of teeth to become perfectly familiar with the general thickness of the walls of the pulp cavity, and the exact location of the pulp, the projections of its horns, or processes, and everything that pertains to its general anatomical location and characteristics. The surgeon who would cut the carotid artery when excising a tumor in its vicinity, through carelessness or a want of anatomical knowledge, would be guilty of a fearful crime, and a dentist who uncovers a pulp of a tooth when shaping a cavity, or when cleaning a cavity which has not as yet reached the pulp, is guilty of as glaring a malpractice as the surgeon would be in the case cited above. If the operator will make careful observations upon all the different classes of teeth, both by making transverse and longitudinal sections of them, examine carefully the thickness of the walls of

the pulp cavity upon the approximal surfaces, the labial and lingual surfaces, mark exactly in the bicuspids and molars the location and number of the pulp processes, ascertain how far they project into the cusps, how far towards the cutting edge the point of the pulp extends in the incisors and canines, observe the exact shape of the pulp in the different kinds of teeth and make a sufficient number of observations upon teeth taken from different mouths, so as to be able to calculate the possible variations from any exact measurement in different temperaments, &c., with tolerable accuracy, he will not be found cutting *accidentally* into the pulps of teeth, and subjecting his patients to unnecessary pain and trouble, and frequently to much unnecessary expense, unless these blunders be due to sheer carelessness.

I would remark in reference to cleaning cavities, that all softened dentine should be thoroughly removed in all cases, except when by leaving a small amount immediately over the pulp, we may thereby avoid uncovering the pulp of the tooth; and all partially decomposed enamel should be cut away, unless in cases when it is advisable to retain it as long as possible to prevent a disfiguration of the mouth. In relation to the shaping of special cavities, I would remark that those upon approximal surfaces are for the most part the ones that present the greatest difficulties, and consequently require the greatest skill and patience. It will, however, be necessary to give special attention to only a few of the most prominent points connected with the shaping of these cavities. The cervical wall is the point that claims our special attention. This not unfrequently is some distance beneath the margin of the gum, is therefore not easily reached, sometimes exceedingly difficult to be seen, and the importance of having this portion thoroughly cleaned and shaped and the margins well smoothed can scarcely be over estimated. Hundreds of operators, whose operations in other locations present a very creditable appearance, totally fail here, failing in some cases to clean away the whole of the softened dentine, in others failing to smooth the margins of the cavity which in this location is attended with much difficulty, failing to shape properly the wall of the cavity, which in many cases is abso-

lutely necessary for the retention of the plug, failing to so introduce the gold as to meet all the necessary indications, and, finally, when all the previous steps have been continuously and skillfully taken, failing to dress up the plug, so that food and destructible materials shall not be retained by the projection of the plug beyond the margin of the cavity, and which by decomposition gives rise to subsequent decay.

To be Continued.

THE RAPID DECAY OF TEETH DURING GESTATION AND LACTATION—THE CAUSE AND REMEDY.

By I. P. Wilson, D.D.S., Burlington, Iowa.

How often have we been asked the question: "Why have my teeth commenced decaying so suddenly?" Mothers frequently speak of the beautiful teeth they had when girls, and wonder why they are now diseased and aching.

And we have even heard the sacrilegious language: "I don't see why our teeth were not made to last us our life time." The Creator certainly designed that such *should* be the case, but our habits of living are such, that this design has been thwarted.

A healthful condition of the teeth is dependent, to a great extent, upon *cleanliness* and the *food* we eat.

We only mention the former, but believe it may be profitable to dwell for a moment on the latter.

Chemical analysis has shown that the human body is composed of fifteen different elements. These constituent parts must be sustained and developed by our food (and drink). If our aliment does not contain all these elements, the system is robbed of its proper nourishment, and consequently must suffer.

Milk and eggs are said to be the only articles of food that contain them all; and hence a *variety* of food is necessary.

The bones of the body contain from 48 to 59 per cent. of the phosphate of lime and the enamel of the teeth from 81 to 88 per cent.

The child in embryo and in infancy is supported by the

mother. An immense supply of these lime salts is required to maintain the mother, and to build up the bony tissues of the child.

When there is not a sufficient amount of the bone yielding substance in her food, her system becomes impoverished, and it is manifest by stomatitis materna, (or nursing sore mouth,) general debility, extreme sensitiveness of the teeth, they commence decaying, and the disease progresses with great rapidity.

Her teeth are *starved* for the want of phosphate of lime. A demand has been made upon her system, that can not be supplied by the food that has heretofore barely sustained her. She must have new supplies for her own support, and for the health and vigorous growth of her child.

The unbolted wheat flour is rich in the lime salts, and furnishes an abundant supply for the sustenance of the teeth and bones, while *fine* flour is almost entirely destitute of this element.

Bread is spoken of as the "staff of life," and well may it be regarded as such, when it is rich in those life supporting elements, but when the bolts in our mills remove from it the very life supporting principle, we can no longer term it the "staff," but rather the unsupporter of life.

The introduction of bolts into flouring mills may be regarded as a calamity.

Observations have proven conclusively that families using the unbolted wheat bread to the exclusion of *fine* flour bread, have better teeth and better health.

It will be seen from the above, that it is a matter of the utmost importance that the mother have proper food during gestation and lactation, and it becomes a duty she owes to herself and her child, that she supply her system with the bone, muscle and nerve producing materials necessary for her own support, and the healthful growth of her child.

"Graham bread" should be made with the same degree of excellence as the fine flour bread now so generally used.

This being done, and its use fully adopted into every family, the happiest results would most certainly follow.

Other articles of food are of equal importance, but I have

been led to speak particularly of the unbolted wheat bread, because of its *disuse*. Good beef-steak, mutton, fowls, eggs, game, milk, and exercise in the fresh air and in the sun, can not fail to have the most beneficial effect upon both mother and child.

A mother who has poor diet, and is furnishing food for her infant, impoverishes her own system, impairs her health, and *starves* her teeth: while she who has good wholesome diet and takes exercise in the fresh air, and in the sun, will find that she has passed this eventful period without injury to her teeth, and without suffering the consequences of an impoverished system.

WHEN SHOULD THE FILE BE USED?

A Paper read before the Wabash Dental Association, March 24, 1869.
By W. F. Morrill.

The practice of using the file on the teeth has been common more than one hundred years. The pioneer dentists knew little beyond this method in preserving the teeth. Rude and ill-contrived as their instruments were, they were compelled to have more space in which to perform their operations than we of a later day. Nicer perceptions of the file's uses have been revealed unto us, and the former excesses, of which many were guilty, have either been abandoned or they are confined to those who revere antiquated habits and customs.

The form of this question—when should the file be used?—infers that at some time or another there are pathological indications which would justify us in its use: that the objects we have in view can not be so well secured as by employing the file. It is true, however, we have among us those who presume to have arrived at that par excellent point of practice where the file becomes obsolete, while other poor mortals, not so blest, are left content to drift along in a custom which has the must of age upon it. Of the former, ignoring the use of the file, I have no acquaintance, nor can I speak with confidence of their successes.

As auxiliary to the purposes of the file, I may mention the large variety and forms of chisels which are now introduced to the profession as possessing great advantages. The separations between teeth can be much more quickly done, the breaking down of projecting enamel walls, and otherwise facilitating our operations in these respects by the aid of chisels than with the use of files. But with all this speed in removing tooth substance, it does not necessarily follow that we shall discard the file. It still has its separate duties to perform. The smooth and regular surfaces, the forms and shapes we desire the teeth to assume as initiatory to filling, require the file. The slight, but necessary, service it does around the cavity's edges just previous to filling, we are beginning to know how important it is.

Of the many abuses of the file there are just grounds of complaint. As an evidence of mischief or distrust the discussion now provoked in this direction is ample testimony. The liberal and, in some instances, the unsparing use of the file should arouse us to a sense of inquiry whether our present practice be sound and correct. We can not disguise the fact that thousands of teeth pay their annual tribute to this sacrificial altar. To destroy one-third or one-half of the tooth substance to preserve the balance, is certainly very primitive practice. The numerous bicuspids, molars and laterals having so much of the tooth tissue wasted, is not flattering nor in keeping with the enlightened progress of our science. By this destructive method, the train of evils afflicting the patients becomes troublesome: particles of food force their way up between the approximal surfaces of the teeth: the gum and investing membrane of the teeth become irritated, which occasions much inconvenience. Added to these evils, we have the loss of the masticating surfaces, together with the symmetry and beauty of the teeth. Moreover, along the margins of cavities filled, and the dentine tissue left unprotected by a flange of gold extending over it, we find streaks of caries making their appearance. Does this practice warrant a continuance, or does it more properly belong to the Chinese or East Indies, rather than to the art and science of American Dentistry?

The time to use the file depends on *the end we have in view, the age of the patient, and the physical characteristics of the teeth.* The indications for the employment of the file are varied and dissimilar. We can scarcely settle upon a fixed rule or method by which to be governed in each case. If we did, unhappy results would surely follow. Among the chief objects to be secured by the file is room for further dental operations. This is now far better attained by the introduction of wedges.

The arrest of caries forms no inconsiderable share of this instrument's use. For this purpose, especially in the incipient stages, recourse to the file is indispensable. It is not uncommon to hear dentists talk quite fluently of the freedom of it on deciduous teeth. It is barely possible their class of patients at this tender age may be more tractable than falls to the lot of others less fortunate, who are unable to speak as favorably of their successes. But the composure necessary for children passing this ordeal is rarely found, and the benefits derived in this direction can not be very many. The green stain deposits on temporary and permanent teeth, which usually require removal, can be done quite as well by employing corundum points and burnishers. The most critical time for our decision when to employ the file may be dated between twelve and sixteen years. At these respective periods with regard to how much tooth substance shall be destroyed, in order to preserve the harmony and beauty of the dentures, demands the exercise of caution and sound judgment. If predisposing signs of caries are manifest, affording apprehension for the future, there should be no hesitancy about the use of file; nor should there be any want of alacrity in its use when dentures are crowded by approximal surfaces of teeth overlapping each other, and no reasonable hope of further expansion of the maxillary bones, either naturally or artificially. That good results are certain to follow at these periods experience clearly demonstrates, and the logic of events can not show to the contrary. Wherever superficial caries prevails the file is serviceable. What the chisel is in the hands of a sculptor, so is the file in the hands of a dental artist.

Culture and experience are reformatory in the use of this valued instrument. We can think of it in the hands of an incompetent person as a weapon of mischief, and in the hands of an intelligent practitioner as one of incomparable value. When to exercise its freedom and when to be sparing of its use, requires observations ripened by more experience than is usually possessed by the many. In a single paper it would be difficult to even hint at the precise dates when the file should be used, and I will not attempt the task. If, however, I have awakened your minds to a higher conception of this important branch of operative dentistry, I will achieve all I intended.

(From the Canada Dental Journal.)

OFFICE MANAGEMENT, AND THE DEPORTMENT AND HABITS OF THE DENTIST.

By R. Trotter, Guelph, Ontario.

The dentist, although he may be perfect, as a gentleman and operator, is often considered as a horror to the community; even foolish mothers frequently restrain their children in their naughtiness by threatening to take them to the dentist: nearly everything that the public have to do with him professionally is classed among the troubles and trials of life. This being the case it is highly essential, for the success of the practitioner and the comfort of his patrons, that his office and everything pertaining to it, should not only be divested of all that is unnecessarily disagreeable but should be made as pleasant and attractive as possible, even to the most fastidious. To this end the office should be fitted up in as neat, attractive, and cheerful a style as possible. Many dental patrons are persons of refinement and good taste, and they, as well as those who are not so, are very much encouraged and fortified on entering the office to find everything neat, clean, in good taste, and inoffensive. Gentlemanly deportment in and out of the office, and tidy and correct personal habits are essential requisites of the dentist. If any man has an excuse for bordering on foppishness it is he. His calling permits him to dress

neatly and be always clean, and the comfort and confidence of his patients demand it. The habits of smoking and chewing tobacco, snuffing, drinking strong drinks, ought to be eschewed, if not totally, until after office hours. His hands should always be washed before commencing to operate, and burs, excavators, and files should as a general thing be cleansed with a brush and water in the presence of the patient. This is something that I think is generally overlooked by the profession, but not by patrons, as I have frequently heard patients speak with disgust of instruments being used in their mouths without cleansing, which had but a short time before been used for others.

The dentist ought to consider a bad breath as tantamount to a disability to practice, and when it exists ought to use immediate and effectual means to remove it.

Many other hints under this caption might be given, but the writer is satisfied that the good sense and intelligence of the profession will prevent their losing sight of the little, but not unimportant details of their calling.

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CARBOLIC ACID AND GLYCERINE IN THE TREATMENT OF ALVEOLAR ABSCESS

Creosote has long been a favorite remedial agent with the dentist in the treatment of alveolar abscess, as well as of teeth with dead pulps where no abscess has as yet supervened, and, indeed, in many other diseased conditions of the gums and mucous membranes of the mouth. We have lately been making use of carbolic acid and glycerine, one drachm of the former to one ounce of the latter, and find it not only much more pleasant to the patient but more efficacious in removing all fetor from the fangs of abscessed teeth, requiring, as a general thing, less time than by the use of creosote or carbolic acid alone, and as it is indisputably one of the best, if not the very best, antiseptic known, it will, we think, soon come into general use. We would by no means insist upon the exact proportions which have been given above, and it might be well to dilute the glycerine with water, in some cases, perhaps, when it was desirable to force it

through small root canals, but for general use the preparation of one drachm to the ounce of glycerine will answer every purpose. A preparation of the same elements, with about forty grains to the ounce, is an exceedingly pleasant and efficacious remedy for aphthous sore mouth, and those exceedingly painful and troublesome inflammatory patches frequently found upon the edges of the tongue and upon the mucous membranes of the oral cavity. Perhaps its greater efficacy may be accounted for from the fact, that the glycerine is almost, if not entirely, wanting in volatility, and medicinal agents mixed with it are consequently held for a long time in direct contact with the part to which it is applied.

J.

CORRESPONDENCE.

Dr. Taylor, of Fort Madison, writes as follows:

To sharpen points on pluggers without drawing temper, I use a very fine, small, three-cornered file, and finish with a knife-edged oil stone, the latter can be made by grinding down a "slip" on a carpenter's grind-stone.

Oil stones used at the chair and in the laboratory can be smoothed after long use by grinding in the same manner.

For heating water to use at the chair, a small brittania cup with a cover; heat over an annealing lamp and the water will keep warm for a long time if kept well covered.

The best disinfecting agent I have found for office use is a tablespoonful of carbolate of lime in a quart of water; it has not the unpleasant smell of lime alone, is more efficacious, and costs less.

Speaking of disinfectants I have a piece of tartar, two inches in circumference recently taken off a tooth in a ladies'—no, woman's —no, I mean a female's (of species homo)—mouth; "all other things being equal" would not she be a nice assistant at a small tea-party.

Mechanical and Miscellaneous Department.

SUBSTITUTES FOR RUBBER BASE.

At no time has the desire for some material to fill the place of rubber, as a base for artificial teeth, been greater than at the present. The rubber monopoly having achieved a victory over the profession in the courts of our country, they are now making use of every means in their power to force compliance with their terms. The country is flooded with their hirelings, and by fair and foul means they are reaping an abundant harvest at the expense of those who have made any use of their truck for the past two years. If they are met with a refusal, they threaten both patient and operator with prosecution. Having, as they say, the law on their side, they will listen to no argument save that of money. In many cases the amount of their demand is regulated by the length of the victim's purse, not by the amount of rubber work he has done. The course pursued by the rubber company is one of oppression, and should prompt the profession to throw off the yoke as soon as possible, by adopting the use of some other material in the place of the rubber. The cry comes to us from every quarter, What shall we do to be saved from the rubber agents? We answer: Settle with them for the past on the best terms possible, and then let them and their rubber alone. "But," says one, "my patients demand cheap work, and I must accommodate them or lose their patronage." Let us see if we cannot find something in the list of materials which have lately been offered as substitutes for rubber, which will answer the purpose quite as well, if not better.

We suggest first, Adamantine Base, as worthy of trial. Dr. Moffit, the inventor, says he has used it *with success* for the past eight years, and claims for it all the advantages of the rubber as a cheap base. We have been testing it, and find, as Dr. M. says, it can be put up as easily as rubber work and in as short a time;

if there be any difference it is in favor of the adamantine base. It is finished up with much less labor, and when completed is quite as sightly. It is stronger than rubber, and is more easily repaired when broken. From the little experience we have had with it, we think it can be worn with more comfort in many cases than rubber; it does not seem to irritate the mucous membrane and soft parts as the rubber is known to. It changes color slightly on being worn in the mouth, and is a little heavier than the rubber plate; it can, however, be made much thinner than it, and costs little, if any, more. The following instructions, published by Dr. Moffit, will enable any one skilled in the manipulation of rubber to construct a set on adamantine base; we hope it may be thoroughly tested:—

"After taking the impression, varnish and oil, or soap. Mix a sufficient quantity of the material for the model,—equal parts fine sand and plaster; make the same as for rubber work. Make the antagonizing cast, and set the teeth as for other work, which should be done with *as little wax as possible*. Take care to have *no more bulk or thickness of wax than will be required* for the thickness of the plate, as any excess has a tendency to increase the weight, or make unnecessary work in finishing.

Mix a sufficient quantity of the moulding material to set the case in the lower section of the flask; set the case in so that the lower line of the wax rim will be on a line with the edge of the flask; allow the moulding material to cover the wax rim, or come up to the edge: varnish with a thin coating of shellac varnish: oil or soap all *except the teeth.*

Close the funnel of the sections with paper, cotton, or any suitable material, and place it in position: fill up with the moulding material, place the top on, and secure with key.

After it is hard, which requires but a few minutes, part it, remove the wax, and cut away from the back of the cast to the funnel, and make perfectly free from particles of sand or dirt: cut vents from the condyles of the cast to the upper part of the flask on each side the funnel.

Close the flask, place it in the oven of a stove or other suita-

ble place, and let it remain until *perfectly dry*, and as hot as the melted metal. It will then be ready to receive the metal. Melt the metal in a small iron ladle, or other suitable vessel. When melted, set the flask up, pour in quickly and steadily. When it is seen to run from the vents, pour until the funnel is nearly full.

Allow it to stand still until cold. Part the flask, remove and finish with the file, scraper, brush wheels, &c.

NOTE.—*To repair the work in case of accident.*—Break away the injured tooth or block; cut enough of the material of the plate away to make room for sufficient new material to retain a new block or tooth.

Coat the exposed parts of the plate, or the parts cut away, with chloride of zinc, or zinc dissolved in muriatic acid: fit in the block or tooth: then with a hot spatula, or other suitable instrument, melt in and smooth down a sufficient quantity of the solder to fill up the space: finish off, and the case is completed.

J. W. MOFFITT, *Dentist.*

No. 25 North Second street, Harrisburg, Pa.

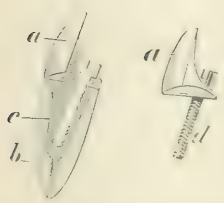
There is another style of work which has been lately introduced in this city by Dr. E. Hale, a description of which appeared in the May No. of the *Journal*, that promises well. Possessing, as it seems to do, all the advantages claimed for rubber, it bids fair to be its strongest rival. Dr. H. uses aluminum plate for a base, attaching the teeth by means of rubber or adamantine. For a minute description of his method of constructing plates, we refer the reader to Dr. Hale's article, published in the May No., suggesting the use, however, of adamantine, instead of the rubber, as described.

This style of work possesses many advantages over the rubber. Is much lighter, where rubber is used as a means of attachment: is less cumbersome: is stronger, looks as well in the mouth and much better out of it: is pleasanter to wear: not liable to the objection urged against rubber, that of irritation to the soft parts: is more easily repaired when broken, if adamantine be used in combination with the aluminum: costs but little, if any, more than the rubber base, and takes but little more time or skill to construct it.

Of its durability, personally we know but little, having had but little experience with aluminum as a base: from the few observations we *have* made and the testimony of others upon the use of this metal, we do not hesitate to say that it is acted upon less by the secretions found in the oral cavity than rubber. We therefore think it must prove more durable than rubber. We are at present wearing an aluminum plate, constructed after the Hale method, with adamantine attachment, and find it much more pleasant and comfortable in every way than a rubber plate, which we have heretofore worn. The processes of Drs. Moffitt and Hale are both patented; but the restrictions in the adamantie process apply only to the making of the metal. This is made solely by the inventor, and sold at $8.00 per pound. Dr. Hale's terms have not been made public: but we are assured by the Dr. that it shall be placed within the reach of every one. We regret the necessity that compels any one in the profession to bind up his improvements with a patent, and hope the time is not far distant, when dental patents will be counted among the things that have been.

A METHOD OF GRAFTING ARTIFICIAL CROWNS ON THE ROOTS OF TEETH.

By G. V. Black, Jacksonville, Ills.



a, a. Artificial crown with gold backing.
b. Canal in apex of root, filled.
c. Canal in root, enlarged and filled.
d. Gold bolt.

The nerve canal of the root is first treated and filled in the same manner as for filling, except that it need not be filled more than one-third of its length.

The fragments of the decayed crown are cut away, and the end of the root dressed off, as for the ordinary pivot tooth.

The canal in the root is drilled out and enlarged, as much as is consistent with sufficient strength, and the margins beveled off all round to the gums, in such a manner that when the root is filled, the end will be entirely covered.

This enlargement of the canal is now filled, perfectly and solidly, with cohesive gold, every part of which should be welded in the most perfect manner.

A plain plate tooth is selected to match the adjoining natural teeth, and carefully fitted to the position. This tooth should be as thin as possible, with the rivets placed laterally, instead of one above another, and if they stand well apart, so that the bolt may pass between them, all the better.

Back the tooth with a very thin piece of pure gold plate, and bend the rivets outward toward either side of the tooth and flatten them down. Take another slip of plate, and fit it perfectly to the end of the root in the mouth, and trim to size, so that it will just cover it. If this little plate be very light, and well annealed, it may be very perfectly fitted, by pressing it to the end of the root with a round burnisher. This plate is now laid on the end of the root, and the root placed in position upon it, held with the fingers, and a little ball of softened wax pressed down behind it, uniting the tooth to the plate covering the root, and all is removed together, the wax is cooled and trimmed, the whole replaced in position, and any necessary corrections made.

When the fit is ascertained to be correct, the tooth and plate covering the root, as waxed together, are invested in plaster, the wax removed, and fine gold solder flowed in until the back of the tooth is filled out to the full shape of the natural tooth. After it is cool, dress off, and polish.

With a drill, fitting about 15 of the plate gauge, bore through the gold backing in the direction of the pivot hole in the ordinary pivot tooth, except that it must generally be a little farther back, and inclined slightly backward, to escape the tooth itself or its rivets; also to make room for an enlargement of the lingual portion of the drill hole, necessary for the reception of the bolt-head.

A bolt is now made of gold, of the proper size to fit the drill hole in the tooth, long enough to reach half or two-thirds the length of the root, of the form of an ordinary watch screw or bolt, and a good thread cut upon it.

Set the tooth in position on the root, and introduce a drill of proper size through the bolt hole in its backing. Drill down through the gold filling in the root, to a sufficient depth. This hole will be generally a little back of the centre of the end of the root, and should be directed forward and upward, so that the terminus will be in front of the centre of the root; thus giving more room for the bolt head in the lingual surface of the tooth.

Cut a screw thread in the drill hole in the root; set the tooth in position, introduce the gold bolt, and with a little screw-driver screw it firmly to its place; finish off the bolt head, so as to make the lingual surface of the tooth perfect. except, perhaps, a little slit for the screw-driver.

It will generally be well to allow the patient to wear the tooth a week or so before the bolt head is finished off, in order that it may be tightened once or twice, after which I have never had one loosen in the slightest degree.

It will sometimes be found in very small lateral incisors, to be impracticable to enlarge the root canal enough to introduce a sufficiently large amount of gold to accommodate the bolt, without cutting through into the surrounding walls.

In such cases it is better to fill the natural canal entirely up —set the tooth in position—then make a drill hole as before directed, inclining forward across the nerve canal in the same manner.

The outer end of this may be enlarged and prepared for a gold filling: the balance slightly enlarged, and a gold cylinder, with a screw thread outside and inside, screwed firmly into it, and then gold packed in perfectly around it until the end of the root is covered as before, and the whole dressed down, and the operation completed substantially as before stated.

We have by this method the best artificial crown I have ever seen. The exposed end of the root is perfectly protected from decay by the gold filling, we have a most perfect anchorage in the root, and a good gold bolt is sufficient to hold the tooth against any ordinary usage.

The direction of the bolt is an advantage, giving greater strength in exactly the direction that strength is required.

It may be objected that this plan is difficult to the operator and expensive to the patient. So it is: yet I think it would be difficult to induce a patient who had tried one of them to exchange it for a plate tooth and all the trouble of a plate in the mouth, for ten times its cost.

I would suggest to the manufacturers of teeth that a tooth of this form might be made, with a bolt hole lined with platinum, that would answer an excellent purpose.

TO REFIT RUBBER PLATES.

Temporary plates get out of fit in a few weeks: especially the buccal borders, which we find projecting far beyond the gums, over the alveoli of the molars.

But whenever a plate needs *filling up*, to fit it to the altered gums, "White's prepared gutta-percha," for temporary fittings, will be found to answer admirably. Holes may be drilled *in* the plate at suitable points, and *through* the plate if necessary, and portions of *this* gutta-percha warmed and put where wanted. The teeth are then placed in the mouth and pressed to their proper bearings. I lately had occasion to refit a very loose rubber plate; and by using one dollar's worth of White's prepared gutta-percha, and a half-hour's time, I had the pleasure of making a successful refit. This gutta-percha, I think, may be colored to resemble the natural shade of the gums, which will make it still more valuable. C.

FIFTH ANNUAL MEETING OF THE MISSOURI STATE DENTAL ASSOCIATION.

This Association met at the Polytechnic Institute, on the first day of June. The attendance was not as large as it ought to have been, but the discussions were marked by much ability, and were listened to with great interest. Wm. H. Eames was elected President, H. E. Depp, of Sedalia, First Vice-President, and W. E. Tucker, of Otterville, Second Vice-President, J. R. Mathews, Recording Secretary, and R. J. Porre, Treasurer.

The proceedings were harmonious, and as but one half-day was devoted to miscellaneous business, there was plenty of time to give to the discussions of the various sections upon different subjects which were read before the association. The subject of mechanical dentistry was thoroughly ventilated, and the merits and demerits of the various kinds of cheap plate work were carefully examined. It seemed to be pretty generally conceded that the adamantine base was at least as good as rubber and as easily worked, and that the expense was very little if any greater, whilst Hale's method of attaching teeth to the aluminum base, which is exceedingly simple, furnishes a base far superior to rubber, and when coated with platinum, by a method suggested by Prof. Eames, will leave little more to desire. This method of coating with platinum is so simple that it can be done by any one in a few minutes at a mere nominal expense, so that if it should wear off it could at any time be recoated at an expense of probably less than 25cts. per plate. It was not claimed that aluminum or adamantine bases contained all the desirable characteristics of a base for artificial teeth, but that they are better adapted to that purpose than rubber. Gold and platinum were universally acknowledged to be the best substances yet used for first class work. The discussions upon scientific points relating to the practice of dentistry were full of interest and showed plainly that many members of the association have been actively engaged in the last few years in the pursuit of scientific investigations. After three days of active work the Association adjourned, to meet in St. Louis on the first Tuesday of June 1870. J.

AMERICAN MEDICAL ASSOCIATION.

The American Medical Association, which commenced its session on May 4, at New Orleans, was characterized by the good feeling and harmony which prevailed among the members, and may emphatically be said to have been an active working session. Many important papers were read, discussed and referred to the publishing committee and a large amount of important business

transacted. We were particularly struck with the good order and general decorum which prevailed throughout, and moreover by the ability and oratorical powers exhibited by a great majority of those who addressed the association. A single attempt was made apparently to advertise the special advantages of a particular medical school, but the association did not seem to appreciate it, and it was quickly evident that the speaker and the school which he represented, had lost caste by the effort. In fact the association was in no humor for "grinding axes" for individuals or individual medical colleges, but was determined to give its whole time and energy to the cause of medical reform and medical progress. No excursions or entertainments were allowed to interfere with its business transactions, though after the association adjourned many members accepted an invitation to a steamboat excursion down the river about forty miles below the city, affording the excursionists opportunity of viewing the Jackson battle ground, the fine plantations and orange groves lining the river below the city, the old forts which Commodore Farragut passed amidst fire and smoke on his way to the Crescent City during the late war, and other points made memorable in days past and gone, which contributed much to the interest of the occasion.

The session continued four days, and with the exception perhaps of a few disappointed aspirants for office, all seemed to feel that the time had been well spent.

The next meeting of the association will be held at Washington city on the 1st Tuesday of May, 1869.

While in New Orleans, we spent one evening at a meeting of the New Orleans Dental Society, held at the office of Dr. Lawrence, where we met with a goodly number of the wholesouled dental fraternity of the city, together with Prof. S. P. Cutler, of Holly Springs, Miss., and we need scarcely say that the evening was profitably and pleasantly, and somewhat lengthily spent. In common, we think, with a large majority of the members, we return to our labors feeling well paid for the time that we have given to this meeting of the association. J.

ILLINOIS STATE DENTAL SOCIETY.

The above society met at Quincy on Tuesday, May 11, and continued in session three days. I had the pleasure of being present on the second and third days. Quite a delegation of St. Louis dentists were present.

There was a full attendance of the best *material* in the state of Illinois, and that is saying a good deal, for Illinois can boast of many well educated and splendid operators.

A large number of *very* able papers were read, which showed patient labor and research. The discussions following these papers were such as any society may be proud of.

The proceedings of this session will be published (as a supplement) in this Journal as soon as they can be prepared. C.

MAD RIVER VALLEY DENTAL ASSOCIATION.

The Mad River Valley Dental Association held its semi-annual meeting on the 18th of May at Oxford, Ohio. We learn from Dr. Roley that about twenty-four practitioners were present, and that the proceedings were characterized by harmony and an earnest desire for professional improvement. These dental associations are doing much to elevate the status of the profession; and the dentist, at this age of the world, who plods along without availing himself of the benefits of these associated efforts in behalf of scientific progress will soon find himself distanced by his more enlightened and better qualified neighbors. J.

IOWA STATE DENTAL SOCIETY.

The seventh Annual Session will be held at Muscatine, Iowa, commencing Tuesday evening, July 20, 1869, at 7 o'clock P. M., and continue two whole days.

We cordially invite all our professional brethren to be present, as we anticipate a good social reunion.

The following gentlemen have been appointed to prepare and read Essays on the occasion:

Dr. L. C. Ingersoll, "Specialties in Medicine and Dentistry."

" J. F. Sanborn, "Odontalgia."

" W. O. Kulp, "Notes on daily practice of Dental Surgery."

" I. P. Wilson, "Dentistry—Its Progress."

" P. T. Smith, "Dental Therapeutics."

" L. M. Jackson, "Dental Fees."

" J. M. Blakesley, "Defective Growth and Early Decay of Deciduous Teeth."

Subjects for Discussion: "Treatment for Exposed Dental Pulps." "Causes of Irregularity and Best Mode of Treatment." "The Necessity of Legislation to Suppress Dental Quackery." "Anæsthetics in Dentistry." "Filling Teeth." "Mechanical Dentistry."

Any one having specimens of malformation, or cases of special interest to the profession, is requested to report the same.

We would urge upon all dentists the importance of being present, if possible, as it is a duty that we owe ourselves, the public and the profession, and as a pleasant and profitable session is anticipated. Dentists from the neighboring States are cordially invited to meet with us and take part in the discussion.

L. C. Ingersoll, *President.*

N. H. Tulloss, *Corres'g. Sec.*

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TENNESSEE STATE DENTAL ASSOCIATION.

The time and place of the third Annual Meeting of the Tennessee State Dental Association having been changed from Lookout Mountain will convene at Nashville, on Thursday, July 22, 1869. You are respectfully invited to attend and take part in the discussions.

Any contributions in the way of original Essays upon Medical or Dental Science will be thankfully received by the Association. Respectfully,

Wm. M. R. Johns, *Sec.*, Sommerville.

Wm. T. Arrington, *Pres.*, Memphis.

The Missouri Dental Journal.

A MONTHLY RECORD OF THE SCIENCE.

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OSSIFICATION OF THE DENTAL PULP.

Read before the Missouri Dental Association, by H. JUDD, M.D., D.D.S.

Under this head are usually included calcification and dentinification of the pulp as well as ossification proper. In a majority of cases which come under this head there is a calcification of the pulp, with some attempt at the formation of dentine. In some cases of ossification, which are more rare than either of the other processes alluded to, the lacunæ are rarely or never well and clearly developed, but simulate the marginal cell of the cementum rather than the common lacunæ of bone. In some cases of calcification there will be seen rudimentary dentinal tubules, but in others the whole mass seems to be made up of homogeneous calcareous matter. In cases of dentinification the dentinal tubes are much more irregular in form than in the crown or fang of a tooth, but are nevertheless as fully and clearly developed as in the normal dentine; and sometimes of even larger calibre than in the latter.

These hard structures are sometimes found in contact, and, as it were, continuous with the inner surface of the dentine, but many times disconnected from the hard tissues altogether, and enclosed by the soft structures of the pulp. The most perfectly developed specimen of this kind that I have ever observed was taken from the centre of a large live pulp.

The most familiar example of dentinification or calcification is found in cases where the teeth are worn off, and the process takes

place as a precautionary method which nature institutes to prevent the exposure of the pulp, and consequently it is of much benefit to those whose teeth suffer in this way. In the pulps of old persons, these hard formations are frequently found even in cases where there has been no appreciable disease of the tooth. In a majority of these cases these formations are confined to the large portion of the pulp which occupies the central cavity of the crown, but occasionally the portions extending through the roots are affected nearly to the apex. These formations produce in a good many cases considerable uneasiness, but the condition is rather characterized by hyperæsthesia than by constant or intermitting pain.

The hyperæsthesia is sometimes extreme, severe pain occurring upon slight irritation. The symptoms simulate to a certain extent those found in cases of exostosis, though in the latter the hyperæsthesia is not so clearly marked. I do not wish to be understood as saying that the symptom is pathognomonic of the disease, for cases are certainly found where it is not present; but of all the symptoms that I have observed that would be of any service in making up a diagnosis, this is the most reliable; and the most troublesome cases that have fallen under my observation have been where the calcification extended into the fangs.

The pathology of this disease is not clearly understood, but that a great majority of cases are due to continued irritation of pulp, there can be no reasonable doubt; but taking into consideration the fact that these formations are found in teeth apparently healthy, we must acknowledge some causative agent with which we are not acquainted.

I am acquainted with no remedial agents that seem to exert a special influence in this disease, but its study has suggested one thought relative to the treatment of exposed pulps. In cases where these are plugged, would not a current of electricity passed daily through the tooth supply the necessary stimulus to induce the formation of secondary dentine by the tissues of the pulp, and thus restore the normal covering to this delicate organ?

FILLING TEETH.

By H. Judd, M.D.

(*Continued from page* 222.)

In approximal cavities of incisor teeth, the stability of the plug frequently depends, to a great extent, upon this part of the cavity, it being impossible in many cases to so shape the rest of the cavity as to assist to any great extent in retaining it, this being the case when the decay extends nearly to the cutting edge of the tooth; nothing but enamel being left in that direction, and the labial and lingual walls being thin, and so shaped that no assistance can be derived from them. In such cases the cervical wall must be shaped so that it will retain the plug with very little assistance from the other walls. This may be done by drilling under cuts or retaining points nearly in the direction of the long axis of the tooth, between the pulp canal and the external surface of the neck of the tooth, beginning near the line of junction of the labial and lingual surfaces with the approximal surface, the two slightly diverging from each other, and by making another retaining point between these lateral ones, a foundation may be firmly placed upon which the whole plug may be built, and which will need little or no assistance from the other walls to ensure its retention. It will be unnecessary to give special directions for shaping every variety of cavities known, as the general principle already given will suffice for all practical purposes in a great majority of cases. It may, however, be well to revert once more to the approximal cavities of bicuspids and molars, though this subject was partially elucidated whilst treating of the method of approaching cavities. In nearly all cases where these cavities are large, it will be necessary to cut through the grinding surface of the teeth, in which case the opening upon the grinding surface should be decidedly dovetailed in shape, by which the plug can be securely retained, if the cervical wall of the cavity is properly shaped and prepared, even if the labial and lingual walls of the cavity are of such shape that no assistance can be derived from them at all, but in such cases the cervical wall

should be prepared in the same way as has already been described whilst treating of the approximal cavities of incisors. In a majority of cases these labial and lingual walls may easily be properly shaped to assist in the retention of the plug, but in other cases when the decay extends laterally entirely to the enamel, and in some even the enamel itself is entirely broken away upon the sides of the tooth, we must depend upon the dovetail in the grinding surface and the firmly based foundation in the cervical wall for the safety of the plug. Crown cavities of molars, particularly of lower molars, and to a somewhat less degree of upper molars and bicuspids, have furnished convenient opportunities for more swindling dental operations than are presented in any other locations. This is due to the existence of fissures extending from the central cavity and which in hundreds of cases are entirely neglected. It is the constant practice of hundreds simply to ream out the central part with a bur drill and plug the small central cavity without paying any attention to the dark lines extending from it. We shall not attempt to portray the moral turpitude of this imposition upon confiding victims, but we would direct attention to these cavities, not for the purpose of stating that these black lines or fissures should be all carefully and completely worked out, for no tyro in dentistry can be so ignorant as not to know that this is absolutely necessary to the salvation of the teeth, but for the purpose of warning young practitioners not to leave sharp angles at the extremities of the fissures, but to see to it that the extremities be well rounded out, so that a perfect plug may be inserted, which cannot be done if the extremity forms a sharp angle. If a tooth is to be built up in which there is a live pulp, it may be prepared by cutting a groove upon the grinding surface of the tooth, extending around between the pulp canal and enamel, and to the depth of one-third or one-fourth of a line, though if the surface of the tooth be tolerably broad and the height to which it is to be raised is not too great, a series of pits drilled into the surface of the tooth, from one-half a line to one line apart will suffice for the foundation of the plug. The margin of the walls of all cavities are to be slightly beveled off and smoothed with fine files which have been worn

nearly smooth, and this necessity applies more particularly to the cervical wall, where there is always the greatest danger of subsequent decay, and where, on account of the difficulty of reaching and observing this part, it is most frequently and *fatally* neglected. The common drill, bur drill, chisel, excavators and files, are all brought into requisition in shaping and preparing cavities, but the most efficient of them all, in places where it can be used, is the common drill, as it cuts the hardest dentine, or even enamel, with the greatest ease, if it be properly shaped and tempered. The cavity being properly prepared, and the necessary means having been taken to ensure ready access to it, the next question to be discussed is, how shall we exclude all moisture during the operation? Or shall we be obliged to go some two or three decades farther back in the history of dentistry and discuss first the question, Is the exclusion of all the moisture, while plugging teeth, essential, or indeed of any very great importance? Although we have attempted to take up and discuss the various questions connected with the filling of teeth in an elementary manner, we do not think it necessary, at the present time, to spend time upon the latter proposition. We will therefore proceed to the consideration of the former.

(To be Continued.)

THE RUBBER QUESTION.

We are frequently asked what to do about the Goodyear patents. We do not propose to advise any one what to do in the matter, but we are able to lay before our readers some facts that may enable them to determine what to do themselves. In the first place all attempts to contest the validity of their claims are useless. If you use vulcanized rubber you do so with the hands of the Hard Rubber Co. in your pockets, and they are authorized by law to take out of your pockets just as much as they can find there, and you have nothing to say in the matter so far as the law is concerned. As to the Iodized Rubber, it is not probable that in a case thoroughly contested that it will ever be decided to be an infringement of the Goodyear patent, but that

does not necessarily affect the dentist at all, for if he proves in a given case that he does not infringe the Goodyear patent, by showing that he makes use of iodized rubber only, he then affords the other Company all the evidence necessary to convict him of an infringement of the Newbrough patent. So he only jumps out of the frying pan into the fire. But supposing he buys the two patents, next comes in the Cummings' patent and the Hæring patents with their claims, and he is no nearer peace than when he began. These last two patents are for the application of rubber to dental purposes, and have no regard to whether it is hardened by one or the other of these processes, and both claim the same thing. Moreover it makes but little difference whether there is any validity in them or not, as the whole thing of extorting money by such means has been reduced to a system and is regularly operated by rings, and as many men had rather pay fifty or a hundred dollars than incur the trouble, risk and expense of a lawsuit, they succeed in black-mailing the community by threats of prosecution, and accumulate fortunes at the expense of the honest working portion of the community. These rings which get possession of patents which are exceedingly productive, become strong enough to procure extensions of their patents at the hands of Congress as a matter of speculation, the inventor seldom having any interest in the matter whatever.

If the inventors of anything useful to the community at largo as a general thing obtained any considerable share of the benefits accruing from these patents, there would be some little chance to defend the system, but as it exists the whole thing is a huge fraud, a monstrous swindle upon the American people. If you will look at this thing for a moment you will discover that the people of the United States are taxed more to support this system, under the pretence of encouraging the inventive genius of the country, than they are to pay the interest on the national debt. This has become so manifest to the people of Great Britain that a bill is now pending in the House of Commons to abolish the whole system.

The number of patents that have been obtained upon dental improvements may be counted by hundreds, and many of them

are of so simple a nature that they would have suggested themselves to the practitioner just as soon as he had any necessity for using them,—for instance, when rubber first came into use the necessity of headed rivets on teeth suggested itself to every one as soon as he attempted to put up a plate. It required no inventive genius to see it at once, but the sharp individual who is always looking round for the main chance, catched it up, took out a patent for it and you have paid him a yearly tax ever since for so carefully attending to your interests. And so it is in ninety-nine out of every hundred patented improvements. But these speculations will not help you out of your present difficulty, though I hope and trust that a little thought upon this question will rouse a public opinion that will finally shake off this cursed incubus from the land. In reference to the question as to what one can do to avoid these rubber taxes, we say, you can use other materials for bases, and you will be able to do much better for your patients and vastly better for yourselves than you can by the use of rubber. J.

SURGICAL OPERATION OF THE MOUTH FOR ARTIFICIAL TEETH.

That the success which attends the insertion and wearing of artificial teeth is dependent upon the condition of the alveolar processes and gum, at the time the *impression* is taken, there can be no doubt. Many persons ignore this fact altogether, but it is nevertheless true.

After the insertion of a whole upper set of teeth, the alveolar processes often retain their prominence in a great measure for a year or two. If the plate is adapted to a very rough and irregular alveolar border, the pressure of the plate is equal on all portions, and practitioners of much experience know that absorption often takes place over the entire border in the same ratio as the pressure. I have often found the alveolar ridge having, after the end of a year after the extraction of the teeth, the same unevenness that it had when the temporary teeth were made.

This fact led me long ago to take some pains in the surgical

preparation of the mouth, either before or immediately after taking an *impression*.

It is desirable to have a good shaped alveolar border for the permanent set of teeth, for although a plate may be as well adapted to such a mouth as to a smoother one, yet the teeth cannot be as easily fitted to the plate, if the latter be of gold, unless rubber attachments are used, or block teeth carved for the case.

The teeth may be extracted either before or after taking an impression.

Many persons dislike to go without teeth even for a day or two. When this is the case the impression may be taken *before* extraction, and the teeth made ready for insertion as soon as the teeth are extracted, and the surgical preparation of the mouth concluded.

If the teeth are made before extraction, the plaster model should have the teeth all cut away, and all such portions of the gums and alveolar processes as represent those parts which are intended to be removed by the knife and excising process.

When the plate is inserted all portions should be removed which correspond to the parts which have been removed on the plaster cast.

In the extraction of teeth care should be used not to fracture and remove portions of the alveolar border which will produce an unnatural depression when the parts are healed and absorbed. There is not so much care used in extracting with anæsthetics as without them, owing to a desire to extract rapidly. Some practitioners are reckless and care not how much of the alveolar process and gums they tear away. A well performed operation is well done, regardless of time.

Immediately after extraction, the removal of the alveolar process should take place. Otherwise, in a few hours the gums will fall over their edges, and the process of repair and adhesion take place. This is always attended with exalted sensibility of the parts, if not actual inflammation.

Before the patient leaves the chair, then, a pair of *sharp cutting* alveolar forceps, like those marked 61 and 64 on page 33 of S. S. White's catalogue, should be taken in hand and all the buc-

cal and labial borders of the alveolar processes neatly cut away: the septa also, between the alveoli, should be removed to correspond with the level of the buccal and labial borders. Only *small* portions of the *palatine* border need be removed, as absorption of this border is naturally of much less extent than that of the buccal and labial.

After extraction of the molar teeth the gums do not *cover* the alveoli. But by the removal of the alveolar processes they will cover them, and readily unite by adhesion of their edges if care is taken in the operation. If there is a redundancy of gingival tissue, it will be best to use the scissors and cut away merely enough to allow the edges of the gum to meet.

Tepid water and a syringe will remove small portions of loose bone under the gums before leaving the case.

Tincture of calendula will be found useful, 20 drops to the ounce of water, as a lotion for the gums, both at the time of the operation, and for daily use at the home of the patient.

If the temporary set is inserted at the time of its "preparation," they will keep the gums in their place, and protect them during mastication. Perhaps I need not say that the plate should be kept scrupulously clean, as decomposing food, or cast off epithelium, pus corpuscles, and plastic exudation, will cause inflammation and possible sloughing of portions of the gums, if retained on the plate. C.

SENSITIVE DENTOS.—DEVITALIZING THE PULP.

I recently had a case of sensitive dentine and enamel in a tooth of which the pulp had been killed and *extracted*. That portion of dentine nearest the root was not as sensitive as that which joined the enamel in the CUSP. The enamel was very sensitive in paring the edges of it. This fact goes to swell the great number which point to the peri-cementum as the source of nutrition and nervous supply in those cases where the pulp is dead.

* Dentos—tooth bone. This term is a convenient one to apply to the hard portions of the tooth, without distinction.

The circulation of nutritive fluid, (blood plasma), into the most distant portions of dentos, should teach us to be careful how we devitalize the nerves which ramify in every portion of dentine, and send prolongations between the enamel rods.

It is undoubtedly the case that arsenic long retained in a tooth will devitalize the nerve fibrillæ as well as the pulp vessels. I have long been endeavoring to prevent the death of these fibrillæ by saturating the open dentinal tubes with sandarach varnish, before applying the arsenical paste.

Twenty-four hours is the time usually allowed for the arsenic to act on the pulp, at which time its death is expected.

The death of a pulp will frequently take place in the same time even if it is not exposed. Those who have used arsenic to relieve the sensibility of dentine will acknowledge this. Death of the *fibrils* in the dentine takes place, and through these, the pulp. Many years ago, I left arsenic in but six hours for the purpose of destroying the extreme sensibility of dentine, and pulp death was the result.

If a living tooth is better than a dead one, we should beware how we destroy the dentinal fibrils when we "kill the nerve." The death of these fibrils is the cause of the slight discoloration of the tooth when the pulp has been destroyed and *removed*.

Every one of experience knows that a tooth which has had its pulp vessel *destroyed* as well as removed by an *instrument*, is in a more favorable condition for a long and healthy life than when its vessels have been destroyed by arsenic.

In the destruction of the pulp vessels by arsenic, then, we should avoid applying it in the pulp *cavity* to destroy the vessels in the roots.

It is often the case that we are able to remove the contents of the pulp chamber without pain, but when we come to remove the root vessels we find them still alive. Now if we apply arsenic to the remains of these vessels, we hazard the life of the root. Both the dentine and cementum of the root may be devitalized by the least dose of arsenic. Now, it will be better to remove these root vessels with an instrument immediately, or otherwise fill the pulp cavity with a solution of tannin, and wait one or two weeks for

them to *slough*. Separation will usually take place at the extremity of the root canal, and with a slight traction the whole can be easily withdrawn. C.

KEEPING CAVITIES DRY.

It seems strange, after all that has been said on this subject, that men persist in keeping on in their ignorance. The discussions of a meeting of a prominent dental society, in a neighboring city, on this subject, shows most of the debaters to be far from successful in keeping cavities dry. There is not one case in a thousand where it is unavoidable that the cavity should get wet in the operation of plugging the teeth of adults. In the case of unruly children it is different. Neither is there need of stuffing the mouth full of napkins, paper, or spunk, to accomplish a dry plug.

The rubber dam is not used in one case in a thousand where it ought to be. No dentist, either in city or country, should attempt to do without it. And it should not be applied occasionally, merely, but almost daily in the practice of a constant operator at the chair. In the majority of cases it is easily applied; sometimes it may be necessary to wedge or file the teeth apart the thickness of Froid's No. 1 file.

The May No. of this Journal contains an article on the rubber dam. I am induced to call attention to the subject again, believing that it is still very little used by the majority of dentists even in our large cities.

There is sometimes difficulty in keeping the rubber dam to its place without fastening it. In fact it should never be *trusted* without a fastening. When a waxed thread (floss silk is best,) cannot be tied around the tooth and pressed down in close contact with the rubber, especially in cervico-approximal cavities, then an *instrument* should be used that *will* do it.

Mr. Spackler, of this city, makes a very effective instrument for $3 a pair, one for the right and one for the left side of the mouth.

Now if one thinks he can't use the rubber in a certain case, if

he tries to put it on and fails, still there is no need of *submarine filling*. I am astonished that any respectable dentist should dare to announce that he fills "submarine" on any occasion, unless he has an unruly child to deal with. The time has gone by when men can be tolerated in such operations.

The profession have the sublingual duct compressor and tongue holder; with this and a piece of spunk, the submaxillary and sublingual ducts can be *perfectly* closed. With the parotid duct compressors those ducts can be quite as effectually shut up.

A few small pieces of spunk is all that is needed besides, and we can have a dry mouth.

We must all come up to the standard of *dry* cavities. Its importance is the very ground work of all good plugging. There can be no good plugs made without they remain perfectly dry. until the gold is all packed.

I shall continue to talk on this subject until antiquated discussions cease to appear in the proceedings of Societies. C.

BRIDGING.

The operation of bridging over a narrow strip of dentos is too often neglected, for various reasons.

By bridging I mean connecting two or more plugs by a bridge of the same material, when the cavities are separated by a greater or less breadth of enamel and dentine.

In the molars of the upper jaw we often have two crown cavities, separated by a narrow ridge of dentos or tooth bone. There will be less liability to decay if some of the ridge is removed and its place supplied with gold, so as to make one continuous plug of the two cavities. Plugs usually fail first at their margins. There will be far less margin if bridged than if there remain two distinct plugs.

Under molars, especially the sixth year ones, often have four or five small cavities in the crown, at a very early age, separated by abundance of sound dentos.

I recently had a case of this kind.

Boy ten years old has five small cavities in the grinding surface

of crown, which latter is quite concave. Five ravines or grooves run from the top of the basin down its sides, and at the foot of these ravines are the cavities. There is a small but deep cavity in the centre of the *buccal* surface of the tooth, and from thence an almost imperceptible fissure runs to the top of the tooth and connects with the ravine.

Each cavity in the crown is separately excavated. The buccal cavity is excavated, and the imperceptible fissure filed open with a No. 1. Froid.

Every cavity is now plugged separately in the grinding surface, and then all connected together by bridging with gold, and the surface considerably raised, as the natural concavity of the tooth would admit of it without interfering with the occluding tooth. The buccal cavity and fissure were filled and connected with the crown filling. C.

NAPKINS.

By R. C. M.

A dentist to be successful in his operations, and to *please* his patients, should be well supplied with napkins.

Several sizes and different forms are desirable. A large common napkin should *always* be upon the head-rest of the dental chair; neatness demands this changed with each patient.

Never use both sides of the same napkin, it ruins them, and they will wear out before they have done a fraction of the service they would otherwise do: and in changing sides with the head-rest napkin you are liable to soil the chair, particularly if the napkin has evidence of your patient having indulged in a fashionable amount of pomade, or as the case may be—hair dye—sometimes both.

An observing assistant once reminded me she saw something *moving* on a patient's head that prevented her from using the mallet with accustomed care,—this is another reason why the head-rest one should be changed with each patient: besides this, *it looks* nicely, and *it is neat*. Lady patients will not fail to notice

it. The first impression a lady has of a dental office is everything. If she is persuaded you are tidy and neat in your office, she reasonably concludes you are equally attractive and efficient in your professional operations.

These large common napkins, when clean, can be used to place before a patient in taking an impression. In taking a plaster impression this should *always* be placed there, if the napkin is not sufficiently large, a small clean towel may be used. This attention will be appreciated, and regarded as evidence of your professional refinement and good taste.

Mouth napkins may be of various sizes, and of any material to suit the operator; for common use I prefer fine birds-eye diaper, and napkins five inches square, neatly hemmed. A few choice small napkins made of fine handkerchief are very useful: those who aspire to elegant and perfect operations, that have never used them, would soon admire them for their ready adaptation. A fine shape napkin is one about eight inches long, the middle of the napkin two and a-half or three inches wide, and tapers to each end, where it is an inch and a-half wide. This napkin can be used anywhere in the mouth; by doubling it lengthways makes it a good shape for a variety of places.

Napkins made for the mouth should be kept for the mouth, and be soiled as little as possible. Old napkins may be brought into use when medecines are used about the teeth; do not stain a new one when an old one will answer as well.

Old napkins can be used when cleaning a very filthy mouth, and where there is much sponginess, or hæmorrhage from the gums.

Napkins should be washed *clean*. Starch or stiffening should not be used. When ironed, small napkins should not be folded.

Napkins should be occasionally examined; those that are badly stained, and others that may be nearly worn out, should be put by themselves, if good for nothing else they will answer a good purpose to clean the spittoon funnel (that needs cleaning so often).

A clean neat napkin looks nicely upon the instrument stand.

I have found nothing cleaner, or better, than two smoothly

ironed napkins laid one upon the other, to place gold upon, when desiring to pick it up with a plugger.

Finally, a drawer for clean napkins to keep them clean, and a drawer for the soiled napkins to keep them out of sight, is convenient and desirable. Napkins kept in a drawer or box can be delicately perfumed by having between them a scent bag. The following formula was published as "excellent" by the SCIENTIFIC AMERICAN.

R	Coriander, Orris Root, Calamus Aromaticus,.....Sing.	℥iv.
	Lavender Flowers.....	℥viij.
	Rhodium Wood,.....	℥i.
	Musk.....	grs. xx.

Reduce to a coarse powder.

DEATH OF A PULP FROM SEPARATING.

A few days since I extracted the left upper central incisor, which had been dead and suppurating for many years. The crown had protruded considerably beyond its fellow. The root had been shortened one-half by absorption. Pulp death had resulted immediately after a two week's application of rubber between the incisors, for the purpose of separating. The root vessels had been strangulated by the pressure, which was kept up too long for their recovery.

Root vessels are often pressed upon by immediate separation with the *wedge*, but as the latter is seldom in operation more than an hour the pressure is then relieved and the vessels *recover*. As I said in the June number, immediate separation is safer than long continued wedging. C.

ST. LOUIS MICROSCOPICAL SOCIETY.

The St. Louis Microscopical Society was regularly organized on the 7th of July, by adopting a constitution and bye-laws, and the election of the following officers for the ensuing year:

H. Judd, President; D. V. Dean, Vice-President; Wm. H. Eames, Treasurer; T. H. Hammond, Recording Secretary; T. F. Rumbold, Corresponding Secretary; H. Z. Gill, Librarian:

A. J. Steele, T. H. Hammond and Henry S. Chase, Committee on Elections.

After the organization had been completed, some interesting specimens were exhibited by T. F. Rumbold, showing the action of the secretion of the caruncula lachrymalis upon minute organic substances, such as lanugines, fibres of wool, or cotton, or even of wood, which accidentally find their way into the eye, all of which seem to be disintegrated by the action of this fluid.

The meetings, for the present, will be held on the fourth Wednesday of each month.

T. H. HAMMOND, *Secretary.*

The anatomical museum of the St. Louis Medical College was destroyed by fire recently. It was the richest and most valuable of its kind in that section of the country. No insurance on it. We presume the loss included Dr. Pope's extensive and valuable private collection.—*Dental Register.*

The friends of the St. Louis Medical College and of the Missouri Dental College will be gratified to learn that the *Register* is entirely mistaken in this matter. No damage whatever was done to the extensive museum of the college, nor to Dr. Pope's anatomical collection by the late conflagration. But the museum of the St. Louis Academy of Science, which occupied an adjoining building, was totally destroyed. J.

TRANSACTIONS OF THE ILLINOIS STATE DENTAL SOCIETY.

The Fifth Annual Session of the Illinois State Dental Society convened in Liederkranz Hall, Quincy, Illinois, on Tuesday, May 11th, 1869. — the President, Dr. E. H. Kilburne, of Aurora, in the chair — Dr. H. J. Smith, Secretary.

The meeting was called to order at 10 o'clock, A.M., and upon the calling of the roll the following members answered to their names:—

M. S. Dean, G. H. Cushing, J. N. Crouse, Chicago; O. Wilson, E. H. Kilburne, Aurora; C. A. Kitchen, Galva; G. V. Black, Chas. Henry, Jacksonville: H. N. Lewis, H. J. Smith, Quincy; C. O. Dean, Mt. Carroll.

On motion, the regular order of business was suspended for the election of new members. The following gentlemen were elected to membership:

S. M. Sturgis, C. F. Konants, W. De Crow, Quincy; J. W. Hendel, Peoria; R. Matthews, Young America: R. C. Mowbray, Warsaw; S. C. Wilson, Bloomington.

Dr. Cushing offered the following resolution, which was adopted:

Resolved, That the order of business be so amended that those subjects upon which papers have been prepared shall be considered first in order,—the Chair calling each subject in order, and passing such as have no essays, until the essays are exhausted, and then returning to the regular order.

Adjourned till 2.30 P.M.

AFTERNOON SESSION.

The Society met at 2½ o'clock, Dr. Kilburne in the chair. Minutes of the morning session were read and approved. The regular order of business was resumed, and the following address delivered by Dr. M. S. Dean, of Chicago.

ADDRESS OF DR. DEAN.

"MOVE ON," says the Policeman in Bleak House to little Joe, and Destiny, the Policeman of nations, seems to be continually saying "move on" to the American people. How steadily have

we been moving on from the East, Westward, ever since we can remember. Only a few years ago, within the memory of most of us, the little bright belt of civilization on the seaboard only cast a faint glimmer into the thick darkness of the tangled wilderness. Beyond Buffalo, nothing but the ring of the woodman's axe, the smoke of the burning brush-heap, the rude shanty, the wild long-nosed porker, indicated the presence of civilized man.

To-day almost numberless cities dot the whole vast extent from the ocean to the Father of Waters. So many are they that they find even the boundless expanse of prairie, woodland, hill, valley and stream all too narrow for their luxuriant youthful growth, and they shoulder each other for room, and overlap and tangle each other's roots as they seek to draw from the soil (whence after all it must come) the life blood of their gigantic existence. That curious mixture of good and ill which we call civilization, which long seems to have stayed its progress at the Mississippi, as if loth to leave the home of its fathers, was only resting a moment for a wider sweep, a more gigantic stride, and now, having leaped that barrier, and shaken off that hampering regret, still forces its way Westward, and as we stand here to-day, at the former boundary between the East and the West, we can, by straining our eyes, just perceive its onward progress, as it is lost in the shadows of the Rocky Mountains, going to meet its younger sister, who approaches from the Pacific coast.

Already the lightning-wires — the nerve system of commerce and the arts — has quietly crept across the continent, so that the New York merchant whispers the evening report to his San Francisco correspondent almost before *his* day has begun, and the astronomer in Washington or Cambridge sits in his chair in a clear night and compares watches with his friend on the other side of the mountains. Already have we ceased to wonder at this marvelous achievement of modern science, and begun to regard it as a thing of course, like the light and heat of sunshine, for now we have a greater miracle. The *iron road* — the artery system — is now complete from the Atlantic to the Pacific coast. Just twenty-four hours ago the ring of the silver hammer was heard from Promontory Point to the remotest corner of our land,

as it drove the golden spike that riveted the last rail to the sacred Laurel, whose polished *trunk* crowns the victorious completion of the most astounding enterprise the world has ever known, as did once its *twigs* crown the brows of victorious poets and heroes. How appropriate this emblem of victory, for distance has been conquered—not annihilated. Already by the aid of steam the permanently crystalized ancient civilization of the extreme East is brought face to face and hand to hand with the young, vigorous and audacious growth of the far West. We shall marvel a moment at the temples to Fo, and joss-houses appearing amid the waves of American enterprise, at long-queued Celestials building railroads, at the buffalo startled by the scream of the locomotive, at the dismay of the red man as the lightning train whizzes through his ancestral hunting ground, at the scrambling of the unclean birds and reptiles of Mormonism, as a glare of light streams into their last retreat on this continent. We shall marvel a moment, I say, and then this too will become an old story, and we shall reach still farther westward for a new sensation.

It is perhaps in obedience to this inevitable impulse westward, following the heavenly bodies in their apparent course, that we find ourselves here to-day. Two years ago our young Society hardly dare venture outside of Chicago, its birth-place. Last year it trusted itself on the wide prairies near the interior of the State, with fear and distrust, timidly making a move southward, lest it should seem too bold if it looked straight towards its goal, and having stopped at Springfield a twelve-month for refreshments, has continued on its way, till to-day we stand on the banks of the Mississippi. Our faces are still turned to the setting sun, but I hardly see how we can proceed farther, at least as a Society. For though as men of science we know no limits of space or thought, yet as a Society we are unfortunately—or perhaps fortunately—limited to that spot of earth which we glory in calling our home, and notwithstanding this strong westward impulse, we could not go farther without making a slight detour here, and following the course of this mighty river a short distance, that we might see the cheering faces of our neighbors at their homes on the other bank of this great stream that rolls

at our feet, and who have done so much for our Society at its former meetings. We associate their kindly presence with animation and encouragement, and it is to them that our prosperity is very greatly due. They have endeared themselves to us as individuals, and as a Society, by their acts of disinterested kindness and courtesy, so that we can never cease to hold them in grateful remembrance. Such men as these beckon us on; not with the cry of those of Macedonia, "Come over and help us!" (for those standing at the head of their profession, at home or abroad, at the operating chair, in the lecture room, or at the editorial desk, need no help from us,) but with that other cry, in holy writ, "Come with us, and we will do you good." But, gentlemen, we can't come as a Society, for we must stop somewhere, and in this matter, at least, will be bound by State lines.

But, gentlemen of the Illinois State Dental Society, whether we stand on the banks of the Mississippi, by virtue of the impulse Westward, it is certainly due to that impulse that we exist anywhere at all. For these Societies are at once the flower, the fruit, and the seed of that vigorous American enterprise that pushes forward the borders of civilization still farther and farther towards the Pacific. For who are these men whom I see around me to-day? Who are these who have left their distant homes, (and distance means something in Illinois,) who have abandoned the daily routine of business and sacrificed their time and means to assemble with us to pay their annual tribute of experience into the Treasury of Knowledge, and draw their annual dividend as well, a transaction where each not only retains that which he imparts, but gains also the accumulated treasure of all, to add to his skill and increase his usefulness. Are they the mere tyros in the profession? Are they the self-sufficient masters of the craft, turned out after a few months of poor tuition, to prey upon the community without even an apology for a scientific foundation? Are they those parasites that fasten themselves upon the profession and support themselves at the expense of its reputation? Do they belong to that older class of practitioners who opened their "shops," in former times, with little manual or

mechanical skill, and less scientific knowledge, and no desire for the acquisition of more?

No, gentlemen, these are not the men that I see around me. These are not the men who frequent this or any other Dental Society. These are like the "bummers" who follow a great army, who avoid the danger and miss the glory, but never fail to have an eye on the plunder. Men of this low grade of moral and professional standing would not—even if they desired it—be admitted to membership in this or any other respectable Dental Society. But who are the men I see around me? Of what material are these Societies composed?

The men who are the most rarely absent from these meetings are those who have attained the highest honors in our Medical and Dental Colleges, or, if less fortunate, those who having missed these advantages of education, have yet, by their own intense and patient efforts in study and practice, raised themselves to the highest rank in their profession. These, already possessed of the widest knowledge, the nicest skill, the subtlest ingenuity of any, have sought this prolific source of improvement, without access to which, in our rapidly advancing profession, even they would soon be outstripped even by the "bummers."

The men whom I see around me, with eyes kindled with enthusiasm at this moment, of whatever age, of whatever degree of learning, of whatever extent of practical experience, are live students of their specialty, and devote the best energies of their life to its science and practice. They are men who seize every leisure moment from the often exhaustive routine of their practice to solve some problem of the youthful science which they have espoused. They are men who study thoroughly the literature of their profession and its collateral sciences. They are those who welcome the dental periodicals—those fleet couriers which shoot ahead of, and never can be overtaken by the standard works—as one of the necessities of their daily life, who, from these periodicals, select the real from the fictitious, the practical from the merely speculative, laying away the grain in their garners and throwing out the chaff. They are men who neither despise anything because it is new, nor throw anything

away because it is old, but who examine everything with caution, appropriating whatever is found to be really good, and boldly casting aside whatever has been absolutely outgrown.

They are men who labor not merely for the paltry fee, nor for popular fame, but who seek to raise the rank of the profession, and increase its power to relieve human misery. They are men through whose labors, in time past, we may now justly call our business a profession, and not a trade.

How often in past years have we been pained to see our noble profession regarded as a mere mechanical trade, requiring no previous intellectual training or scientific basis. How often, even now, do we feel the evil effects of this idea—once, perhaps, partially just, but now, happily, wholly erroneous, in petty annoyances in our daily practice. Not uncommonly when a strict professional duty required us to inflict slight pain that greater suffering might be avoided, have we been called unfeeling brutes because the pain seeming needless for the moment, the patient could not give us credit for any scientific knowledge of remote consequences, or any loftier aim than the immediate fee. Some of us may have been directly or indirectly accused of making cavities in teeth supposed to be sound, and in other ways working for our own advantage instead of the good of the patient, where we have been influenced wholly by disinterested motives and enlightened by a more far-reaching science than the patient could comprehend. Few of us have escaped such annoyances unless our shield has been thicker than that of the mighty Ajax, or our persons less vulnerable than that of dread Achilles himself. These proceed from the low estimation in which our art was held, and we can only be relieved from them by patient united exertion to raise the rank of our noble profession to the place it ought to have in the circle of sciences. This work, thanks to the men I see before me, who have acted in union with those of other States for the same end, is already in a great degree accomplished, and it only remains for us to continue in the course in which we have begun, to eradicate, even among the most ignorant of the community, every vestige of suspicion of the nobleness of our calling.

Already are colleges springing up all over our land, and in our State a dental college has just passed through the incipient stages of growth, and it is intended by its projectors to have its arrangements all complete for a full course of instruction during the coming winter. And from what you know of Chicago — the cradle of this infant institution — you may form a tolerably correct opinion as to whether it will be the pride or disgrace of our State, an ornament or a blemish on the fair reputation of that city of which we all, as citizens of the State, feel proud. Our profession, I hope, will soon be protected by law in this, as well as in other States, and so recognized by the legislative authority, as of equal dignity and worth with other branches of medicine.

The men who have been foremost in accomplishing whatever has thus far been done for the good of Dentistry, are such men as I have described, and they are the men I see around me today. You may say, however, that I have been describing the *ideal dentist*, such as he may be imagined, and such as none of us can claim to be. It may be so, but surely we must have our ideal high, for the real is always very far below it. And I appeal to you, gentlemen, if the enthusiasm which you feel in these societies, as well as the profit you gain from them, is not in a direct proportion to the degree of approximation you make to the dentist as I have described him. It is true that by setting up this ideal dentist, I in some manner show to the world our shortcomings, but I also show that we are sufficiently enlightened to perceive them ourselves, and avail ourselves of the best means to remove them: and if these societies are most cherished by the highest members of the profession, there can be no doubt that they are among the best means for the improvement of the most of us. To claim perfection would be but to proclaim our own ignorance. He who claims perfection in this or any other science shows only the narrowness of his mental scope, and the shortness of his intellectual vision. But it is for that reason that we are here to-day, because we do not claim perfection but seek to approximate as nearly as possible to it.

But how can these societies help you? I imagine some one saying, "Being all blind you will only lead each other into more

ditches." I own there seems, at first sight, an absurdity in the idea of men equally in the wrong improving each other by association. But when we come to reflect upon it we shall see that it is not without reason that the best dentist is the most interested in his Dental Society, and receives the most advantage from it.

In the immense field offered by modern science, and in the various course its progress takes, no single man can do much, if he scatter his energies over the whole field, or start off in all the various directions. No life is long enough to make independent research and observation in all the departments, of even so comparatively small a branch as Dentistry. But each one of us may take an infinitesimal division, and when we meet together I give you my views on the subject I have studied, and receive those of each of you in return; so that as to my powers of research, I am multiplied by your number, and gain the net result of the year's labor of you all. Thus it is possible in modern science to make advancement by division of labor, just as in a civilized community a man can buy his tools ready made to more advantage than Robinson Crusoe on a desert island could make them for himself.

It is true, that this advantage is, in a great measure, gained by the Dental Journals, to which I have alluded, but they can not supply the details nearly as well as by these annual gatherings. You can not question the magazine if in any case the writer has failed to make plain, that which seemed to him from his having been long engaged upon that special subject, too clear for explanation. Frequently too, *the best men* have not had time to elaborate suitably for an article, that information which you are at the moment in need of. But here at our meetings, if the masters have time for an essay they produce it, if not, they will give you their views in discussion, or if not *that*, then even a mere question and answer in conversation may inform you of something which could be acquired nowhere else. Nor is this all; all the physical sciences are but the results of countless experiments; and every day is developing some new truth, or exploding some long established false induction or error of observation. Every new carefully observed fact, however unimportant in itself, may be sufficient to establish a theory which before was doubtful, or

upset one which seemed ever so well founded. A single word dropped in the hearing of those whose minds are awake on any subject, may complete the required link in a chain of ideas establishing an important principle, that would otherwise never have been brought into practical use. So any one of us may have discovered during the past year some fragmentary truth, of little value in itself, but which, when joined to that which another has brought, will add a complete unit to the sum of our professional knowledge. Each one, therefore, should throw in his mite, however crude or trifling it may be, (so long as it is a new fact in the profession,) for even if it have no real intrinsic value, it may at least have a suggestive value. No one's youth or want of experience should prevent him from contributing. On the dusty road so often traveled by others before you, your eye may have caught some treasure of incalculable value, which has escaped their search, as they were in pursuit of some more conspicuous prize. Therefore hoard not your thoughts until they become stale. "Thoughts shut up want air and spoil like bales unopened to the sun." So if you have an idea let it out. We come here to analyze, compare and re-arrange the materials each has gathered during the year, and to select and appropriate such parts as may improve each of us and utilize or adorn our profession. So if your idea is a good one, it will be still further improved and widened by the contributions of others, and if it is good for nothing the conceit will soon be taken out of it, by so many lively wits, and the sooner that is done the better. For if you are wrong in your view, you can't be set right too soon, even if at the moment the process annoy you.

It is surprising, too, how much clearer it makes our ideas to ourselves, to endeavor to impart them. After the fall of Fritz, in "La Grande Duchesse," he asks the Duchess for a school in the provinces, "*Sais-tu lire?* Do you know how to read?" says the Duchess. "*Non, c'est pour apprendre!* No, it is to learn that I want it." Fritz's view was more than half right. If you want to learn anything, try to teach it, and the mere attempt to make it plain to others will make your own conception clearer to yourself than would years, perhaps, of solitary study.

It is only on such occasions as this that most of us can have this advantage. The most of us occupy no chairs in institutions of learning, to lecture from to students, and it is only when we get an audience like this, bound to listen to us, whether we are entertaining or not, that we can try Fritz's experiment.

So, also, in the discussions which we have here, we often feel the stimulus of conversation itself. Our minds are quickened by the play of thought, as vivid statement or lively repartee pass from one to another, and we have a sudden insight into the subject under discussion which no amount of study by ourselves would ever have gained in any one of us.

Nor need we confine ourselves here to mere professional improvement. The local intercourse which we here enjoy with so many cultivated men would alone be an excuse for our meetings. By our contact with each other, in the genial mood which a festival always excites, and under a common bond of professional sympathy, we rub off the egotistical armor with which our self-love has invested us, polish down our prejudices, and thaw out the petty jealousies that a professional life is almost sure to occasion.

No matter how jagged, rough or angular a brick-bat may be, as soon as it is rolled by the waves on the shore in company with its fellows, it becomes a smooth round pebble like the rest. By this intercourse we become acquainted with each other and better acquainted with ourselves. Suspicion and distrust yield to confidence and friendship, our bond of fellowship is strengthened and our sphere of influence in our profession greatly enlarged.

Where is the old spirit we can remember, which prompted the practitioner, miser-like, to hoard his knowledge, lest his neighbor should become as wise as himself, and when approached, to present the semblance of the fretful porcupine, and at all times to look upon the new man over the way as a natural enemy. We are glad to see that this spirit is fast yielding to the education which these meetings foster and to the social intercourse they create. We are glad to see that the miser is unlocking his store; that he feels that he is only lending his capital at an immense percentage of usury; that the quills of the porcupine lie as

smoothly as the down of the cider duck (unless indeed you happen to stroke him the wrong way); that the new sign over the way begins to be recognized as the flag of a reinforcement; and that we meet to-day as members of a truly liberal profession, frank to impart, eager to acquire, and always ready to employ our knowledge and skill for the good of mankind.

To all these advantages, to the millennial season I have just pictured, or at least to the best approach to it we can yet make, and indeed for the very purpose that we may more and more nearly approach to it in the future, in the name of this society, I welcome each one of you to this, our Fifth Annual Meeting, inviting you to throw in freely your contribution to science, and to carry away as much of the common store as you can take in, digest and assimilate.

The reading of the address was listened to with marked attention, and on motion of Dr. Wilson, a vote of thanks was tendered to Dr. Dean for his able and interesting address, and the same ordered printed in the daily papers.

The Society then went into an election of officers, and after balloting the following persons were declared duly elected as officers of the Society for the ensuing year:

President—M. S. Dean, of Chicago.

Vice-President—G. V. Black, of Jacksonville.

Secretary—C. Stoddard Smith, of Springfield.

Treasurer—A. W. French, of Springfield.

Librarian—C. O. Dean, of Mt. Carroll.

On motion of Dr. Crouse, the election of the Executive Committee was deferred till after the selection of the place for holding the next meeting.

A ballot for the selection of place of holding the next meeting resulted in the choice of Bloomington.

Balloting for the Executive Committee was then ordered, and pending the announcement of the vote,

Dr. Black moved that the order of business be amended so that hereafter the election of officers be deferred until the close of the session. Carried.

The following gentlemen were then announced duly elected as the Executive Committee for the ensuing year: Drs. Wilson, of Bloomington, Wilson, of Aurora, Cushing, of Chicago, French, of Springfield, and Henry, of Jacksonville.

The report of the Treasurer was then read and referred to the Auditing Committee.

The report of the special Committee, appointed at the last meeting to prepare an address to the people on the subject of the "Six Year Molars" being called for, Dr. Kilburne, the Chairman, asked leave to report to-morrow. Granted.

An election was then held for delegates to the American Dental Association, and the following gentlemen were selected: Drs. Henry, Jacksonville; Hendel, Peoria; Mowbray, Warsaw; Sturgiss, Quincy; Sawyer, Jacksonville; French, Springfield; Cushing, Chicago; M. S. Dean, Chicago; C. S. Smith, Springfield; H. J. Smith, Quincy; Crouse, Chicago; and Edwards, Griggsville. Delegates were authorised to fill vacancies.

Dr. Cushing moved that a reporter be employed to report the debates of the Society. Carried.

Dr. Smith, of Quincy, moved that the Chair appoint several members to operate at clinics from 8 to 10 A.M. Carried, and Drs. Wilson, of Aurora, Crouse and Henry were appointed for to-morrow.

Dr. Cushing moved that Dr. Rivers, of Pittsfield, be appointed to deliver the next annual address. Carried.

Adjourned till 8 A.M. to-morrow.

SECOND DAY—MORNING SESSION.

The Society was called to order at 10 o'clock, the President, Dr. Dean, in the chair.

The minutes of the previous meeting were read and approved.

On motion of Dr. Black, the order of business was suspended for the admission of new members.

Drs. K. B. Davis, of Petersburg, and A. E. Matteson, of Kewanee, were unanimously elected.

The report of the special committee On Six-year Molars being called for, the Chairman, Dr. Kilburne, submitted the following:

MR. PRESIDENT:—In pursuance of your instructions at the last annual meeting of this Society, your Committee have prepared a paper on the subject of The Treatment of the First Permanent Molars of Children, to be published, as far as practicable, in all the public journals throughout the State (as suggested by Dr. Kilburne in an essay upon that subject, and read before the Society at its last annual meeting) with the endorsement or sanction of the Society.

Your Committee have labored under considerable difficulty in preparing a paper of this kind intended for popular perusal from the fact that, as far as possible, all technical terms—incomprehensible to the mass of readers—must be avoided, and at the same time to present in an intelligent manner, the facts we have endeavored to elucidate. And lastly, as an important point, brevity and conciseness have been studied, as it is a well known fact that in this "fast" age of the world, very few people have the patience or disposition to wade through a long prosy article upon a subject in which they conceive themselves not to be vitally interested.

With these explanatory remarks, we herewith submit the following, hoping it will meet your approval and be the means of awakening an interest upon a subject too much neglected by the community in general.

Respectfully,

E. H. KILBURNE, *Chairman.*

CHILDREN'S TEETH—AN APPEAL TO PARENTS.

The proper care and healthy condition of the teeth of children is a subject which should engage the attention and enlist the earnest co-operation of their parents or those to whom their guardianship is entrusted. Yet what indifference, and, we might say, criminal neglect is manifested in this particular by the great majority of even intelligent people.

Parents most assiduous in their devotion to every other phase of the physical training and material interests of their children, who neglect no means within their reach to give them a good education, and whose sympathies are enlisted in the liveliest man-

ner in cases of pain, either physical or mental, yet almost totally ignore the pain and serious inconvenience sure to follow the neglect of this important adjunct of their physical well-being.

The tender solicitude manifested for the temporal welfare of the precious ones committed to your care and guidance stops short of its full realization when the facilities for obtaining knowledge upon this subject are at the command of every one. The object of this article is not to cast censure but to call your attention to some *facts* relative to the eruption, growth and diseases of children's teeth, which it is of the utmost importance you should know and thoroughly appreciate if you would shield your offspring from needless pain, sleepless nights, and yourselves an equal amount of annoyance incidental to it.

From the sixth to the fourteenth year, the teeth of your children especially demand the scrutinizing attention of their parents, aided by the advice and assistance of the family dentist.

The first molars (or double teeth) of the second or permanent set make their appearance usually at the age of from six to eight years, and come immediately behind the last or back teeth of the first set; and coming at so early an age, are, by the majority of people not informed upon the subject, confounded with the temporary set. It is this misconception of the true condition of things which is the cause of so much pain and inconvenience to the child and serious regret to the dentist. These teeth often decay at a very early period, in fact in many instances have hardly made their appearance through the gums before signs of decomposition are discovered. To arrest this decay, and consequent destruction of the tooth lies wholly within the province of the dentist, but in a great majority of instances the decay has progressed to such an extent before it is brought to the notice of the dentist that all ordinary means resorted to for preserving the organ are unavailing. As a natural sequence, the extraction and permanent loss of the tooth is inevitable. Children are seldom brought to the dentist, except when they are driven to it by an aching tooth, and then in nine out of ten cases it is too late to save it. The teeth of the permanent set should always be filled before they ache or cause them any trouble whatever, but how

rarely is this fact recognized or acted upon in regard to their own, or their children's teeth. It is an every day occurrence among dentists of any considerable practice, to have little children brought into their offices to have one or more of these teeth extracted. The dentist, at a glance discovers the true state of the case, and on reminding the parent of his, or her neglect in the premises, is met by the reply, that they "supposed the tooth belonged to the first set," and, as a matter of course, the child must lose it, but on being convinced of his mistake, and told that the tooth if extracted is permanently lost, regrets, (if he has the feelings a parent should have,) that he was not aware of the fact. The extraction of these teeth for these little ones is one of the most painful duties a conscientious dentist has to perform, yet do it he must, and the innocent child is made to suffer in consequence of the inexcusable ignorance and neglect of its parents. This subject has often been written about, and more often discoursed upon by the dentist to his patient in the chair, yet such is the obtuseness of the majority of people upon this subject that they soon forget the lessons inculcated until a recurrence of the trouble again brings them to their senses. To reiterate—let it be distinctly understood by parents, that the first large double (or molar) teeth make their appearance at from six to eight years of age, and that they often decay before they have reached the age of ten, in which case they should be filled in a durable manner by your family dentist, and thereafter be subject to his frequent inspection, in order that he may detect in season any renewal of the disease if it should occur, and apply the necessary remedy. There is seldom any necessity for the loss of these teeth and consequent suffering which children are called upon to endure, if parents would give this subject the attention it deserves. And if these remarks will have the effect of arresting the attention, and inducing a practical application of the same to a small minority of those for whom they are intended, our purpose will be measurably subserved. In summing up we would say be sure and take your child to your dentist at as early an age as six years and as often as once a year thereafter, if you value your child's teeth and would save them unnecessary pain and yourself

much annoyance and great expense, for the old adage is as true in this as in everything else that a "stitch in time saves nine." And above all, we would advise parents to abstain from the very prevalent and pernicious habit of talking before and to their children, of the "awful pain" to be endured in having their teeth filled or extracted.

On motion, the report of the committee was received.

On motion of Dr. Rivers, the paper was referred to a select committee of three, of which Dr. Kilburne was appointed Chairman, with Messrs. Rivers and Black.

The following list of subjects for discussion adopted by the Executive Committee, was then taken up, the subject being opened by the reading of papers by those whose names are attached:

1st. Dental Caries: J. N. Crouse, Chicago.

2d. Preparation of Foil for filling Teeth: G. V. Black, Jacksonville.

3d. Filling Teeth — special points to be observed to secure success: G. H. Cushing, Chicago.

4th. Sensitive Dentine. Causes and Treatment:

5th. Treatment of Exposed Dental Pulps.

6th. Treatment of Roots after Devitalization of Pulps.

7th. Alveolo-Dental Periostitis, causes and treatment: C. Stoddard Smith, Springfield.

8th. Alveolar Abscess; its history, pathology and treatment: Prof. H. Judd, St. Louis.

9th. The File, its use and abuse: M. S. Dean, Chicago.

10th. Anæsthetics in Dentistry: O. Wilson, Aurora.

The first subject in order, Dental Caries, was opened by the reading of the following paper by Dr. Crouse:

DENTAL CARIES.

Mr. President: — The first of our list of subjects for discussion is the one I have chosen for my paper. The cause and prevention of caries is, I think, the first in importance in our profession; it being at the foundation of our specialty.

While this is true, no subject has received so little attention in proportion to its magnitude as the cause and prevention of caries.

While we cannot expect to be able after tracing the causes to their proper source to wholly remedy the evil, yet much good can be done if each one among us does his part toward this reformation. If in this brief paper I can provoke a lively discussion in this body, and out of such discussion stimulate investigation, I shall have accomplished my purpose.

The causes of the decay of teeth may be divided into predisposing and immediate. In tracing the predisposing causes, we must commence with the commencement of life. From the time of conception through the period of utero-gestation and lactation, the health of the mother affects in like manner the health and vigor of the child. Any unhealthy condition of the mother is sure to show itself in the child; her blood, which goes to build up the child, if impoverished does not furnish sufficient nourishment to form healthy organs, and when the child comes into the world it is a poor miserable specimen of humanity, with sluggish circulation, small respiratory organs, or perhaps a weak and imperfect digestive apparatus, or all of these correspondingly affected. With this condition of affairs what must be the result? According to the designs of nature, the mother must furnish the nutriment for the child till the digestive organs are sufficiently developed and are strong enough for something more substantial than the milk of the mother, which is usually indicated by the dental organs making their appearance. We have seen that the impoverished condition of the mother's blood affects the development of the child during gestation, and during lactation her milk will in a corresponding degree be destitute of the necessary elements for a vigorous growth of the child. This deficiency of nourishment from the time of, or at any time subsequent to conception, through the period of gestation and lactation, is nowhere so decidedly marked as in the teeth. Every gentleman present is familiar with the pitted and imperfect condition of the teeth of a child ushered into the world under these unfavorable circumstances; the enamel deficient and the tooth so imperfectly calcified, that caries commences in a few months after eruption. This speedy destruction is hastened by the imperfect physical organization, especially of the digestive organs, and by our manner of preparing our food and the many delicacies and different kinds of food, thus making a combination of evils which act as predisposing causes of decay while

the teeth are forming, and have their influence on the quality of the teeth after they are developed; tending also to vitiate the secretions. Under the head of immediate causes, we have acids, coming in contact with the tooth and destroying it by a chemical process. The sources of this acid are numerous, some are obscure, others more easily accounted for. Under the head of Sources which are obscure, may be enumerated the causes which produce an abnormal or acid condition of the different secretions of the mouth and of the alimentary canal. In fevers, dyspepsia, and a great variety of diseases of the general system, this acid condition of the mouth has been observed. The sources of acid which are more easily understood, are those which are taken into the mouth and come in contact with the teeth, such as medicines containing acid, different kinds of fruit, especially apples which are not wholly matured, pickles, acid in combination with various articles of food, and what is still more destructive, the acid formed by the fermentation of various kinds of food, especially vegetables and different kinds of bread, which lodge about the teeth and are left there from time to time. Another source of acid is its generation by the decomposition of the tooth itself; that is, the decomposition of the dentine produces an acid which continues to destroy the tooth with great rapidity. Still another theory has been advanced by our German brethren. The articles alluded to have recently been copied into several of the dental journals of this country. The hypothesis is, that a growth of fungi or life substance, either animal or vegetable, or both, is produced in the buccal cavity, and about the teeth, acting, as is thought by some, as the chief cause of decay of the teeth; a form of plants or infusoria which penetrate the tubules, or accumulate in masses, and by their presence and action generate the acid condition necessary to destroy the tooth. That these forms of life are present about decaying teeth I suppose is correct, but that they cause the destruction of the tooth is not so evident. As good an explanation of their presence in the conditions above mentioned, is that an acid condition is favorable to their growth, and not that they cause acid or decay.

Having thus briefly and hastily spoken of the causes, what can we do to prevent caries? As I intimated in the commencement, we cannot expect wholly to prevent the evil, yet we can do something. Beginning this part of our work, we must commence with the beginning of life, while the child is yet in the mother's womb and is not respon-

sible, and teach her the responsibilities depending upon her as regards her health. She must be impressed with the necessity of strict regimen: Eating food that is nourishing; not crowding the digestive organs with an excessive amount, or with such food as is difficult to digest. The importance of this is easily understood when we remember that she must digest food enough for the growth of her child as well as for her own nourishment. Hence plain nutritious food in sufficient quantities and at proper intervals is of the utmost importance; also moderate exercise and enough of it to keep the digestive organs active. This should be taken in the open air and sunshine as much as possible; the house should be well ventilated. If every mother could be made to feel the responsibilities depending upon her, the necessity of her obeying all the laws of health for the benefit of her offspring; if she could realize the injury she inflicts upon her child by disobeying, and the good resulting from obeying these laws, I am persuaded, we should have fewer puny children and much less trouble with decayed teeth.

The same plan holds good when the time comes for the child to be nourished from other sources than the mother's breast; avoiding food difficult to digest — as its little organs must undergo a great change before it can digest such food as would be proper for an adult. These laws of health hold good in all ages and conditions of life. Hence the importance of our urgently pressing them upon the attention of our patients, especially the heads of families. The strict observance of these laws will remedy many of the difficulties which produce acid secretions, which I have spoken of as obscure; although much assiduous investigation is necessary before we can trace some of the remote sources of acid to their proper cause. Much benefit will result from the use of prepared chalk in abundance about the teeth and gums three or four times daily; it neutralizes the acids of the mouth and when swallowed has the same influence on the acids of the stomach. Medicines containing acid, when administered, should be taken through a glass tube or in the form of a pill. In regard to those sources of acid which were easily understood, such as unripe fruits, pickles, &c., the prevention is easy, simply abstain from their use. Strict attention to keeping the teeth clean — removing all particles of food after eating, which can be done best with a quill, or better still with floss silk drawn between the teeth — will prevent the formation of acid by the fermentation of food about the teeth, also the evil re-

sulting from this food acting as a retainer, keeping the acids of the mouth in proximity to the tooth much longer than if removed. In conclusion let me urge upon each one the necessity of laboring with our patients for the observance of these precautions

Dr. Cushing said, that the subject of prevention must be considered in the light of the fact that we are living in an artificial manner; does not hope that precautionary measures will ever completely arrest dental caries, while there is no question about the influence of these measures if we could persuade persons to adopt them. Every one knows the tendency to neglect which manifests itself, and we can scarcely hope to lessen the natural tendency to decay until we can secure absolute cleanliness, which is impossible, especially with children, and many times with parents, to such a degree as to be discouraging. Acids of fruit do act upon the teeth, but it can hardly be supposed that they were not intended for use, and this fact shows the depraved condition of the teeth.

Dr. Kilburne,—agreed with some of the remarks of Dr. Cushing with others he did not. One fact, he said, outweighs a thousand theories. He is very fond of pickles, and eats at least four gallons yearly, of the sharpest character, also uses vinegar; and as to its effect on his teeth, states that he has not had a decayed tooth since 1860. If acids have such destructive effect on teeth his should have been gone long ago, but the direct effect is not observable. The idea of instructing mothers and pregnant females is very well in theory, but the subject can not be approached with delicacy in many cases, and he regards the plan as impracticable. Considers cleanliness the main point—cleanliness, which is next to godliness.

Dr. French:—approves of the paper, but thinks it does not go far enough. We could not prevent decay if we could govern utero-gestation. We find savage nations to have good teeth, and our race has deteriorated to such an extent that ten generations would hardly produce good teeth. Breeders of animals understand that it takes many generations to effect a change in the progeny. Having treated causes we must still deal with things

as we find them, which is a condition of decay in nearly every mouth, transmitted over three or four generations. These causes and modes of treatment have been thoroughly discussed. Incidental causes are productive of decay, but how will you account for a cavity in a molar externally small, but internally extensive? He regards casual causes as insufficient to produce this result. What is needed is the dissemination of information, but the results of this in many cases are such as to disgust him with the attempt.

Dr. Mowbray,

Said he did not know whether Dr. Crouse was looking over his shoulder or he over Dr. Crouse's, but he had certainly written very similar views in an article on "Abrasion of the Teeth." Does not think the result depends entirely upon acids, or any single cause, but the causes are numerous; no doubt the excess of gastric juice known to exist so frequently in dyspepsia as well as other disorders of the stomach, have a pernicious effect upon the teeth.

Cleanliness is almost a complete preventive. If children neglected their faces as they do their teeth, they would soon have decayed faces, as well as decayed teeth.

Acids are found in all the fruits: the malic and acetic in the apple, the citric in the lemon, &c. In fact the malic, acetic, citric, and tartaric acids are found in the various proportions in all the small fruits, and no doubt nature designed them for our good. The *excess* of acid about the teeth when the teeth are "on edge," should be neutralized by prepared chalk or other alkali. A sympathetic action exists between the stomach and the mouth; we must go to the stomach to treat vitiated secretions.

Dr. Kilburne:—What would be the effect of an extensive use of chalk on the blood?

Dr. Mowbray, in reply, said he would not use these substances in the stomach, but as a local application to the teeth.

Dr. Crouse,

Did not suppose any one would except to the view that the diet effects the teeth, and, as proof of his position, refers to the fact that teeth of foreigners decay upon the change of diet expe-

rienced by coming to this country; also to the use of chalk to neutralize acids in his own mouth, followed by relief from the effects of the acid. Alluded to a dentifrice vended by a traveling quack who removed tartar without instruments, which destroyed a tooth placed in it in a few hours. Referred to an article by J. S. Dodge on spontaneous decomposition; cavities such as referred to having small external openings prove that sufficient acid cannot be admitted to produce the results. As to fruit, he specifies particularly unripe apples, and refers to his own experience. He does not think nature designs that unripe fruit should be eaten. If any one disputes that during gestation and lactation the teeth are subject to influences bearing upon the mother, let him consider that rhubarb is often administered to the mother during lactation to operate upon the child. The teeth of children will not be as good as if our females were all healthy. Diet, dress, &c., influence these matters, and we are often discouraged in giving advice. He regards mock modesty as unbecoming and put on: hasn't much of any kind himself, and any one troubled that way had better shut up shop.

Dr. French, did not suppose that any one would understand him to say that diet does not effect the teeth — only meant to say that attention to it would not remedy the matter entirely.

Dr. Kitchen:—As dentists we use too much theory and too little common sense in our instructions to patients calling with children for the treatment of the six year molars. In a great majority of cases, children are not taken to the dentist until disease has very considerably advanced in the teeth described.

As to instructions to be given to pregnant females in regard to diet, etc., it is not always practicable, as comparatively few females wait upon the dentist during the period of gestation, and instructions given at other times would be forgotten or disregarded.

The importance of cleanliness of the deciduous teeth should be urged upon parent and child, as care of the temporary teeth would in almost all cases insure the health of the six year molars. Cold water, with a tooth brush, would be better than an indiscriminate use of powders, etc. We should, in our instructions to

parents and children, make them feel that we are in earnest, and not only should we be in earnest, but we should be examples for them. For a dentist to remove a quid of tobacco from his mouth for the purpose of lecturing his patients upon the importance of cleanliness, is very incongruous. [Loud applause.]

Dr. Rivers:—While recognizing the importance of cleanliness, thinks we must go back of that. Teeth are composed of the phosphates of lime, and it is necessary that the supply be kept up. In our present diet we are robbed of these substances, and we should instruct patients that the reason why their children's teeth decay so soon is because these materials are not supplied. Does not think it offensive to delicacy to instruct females on the subject; though sometimes discouraged, he is satisfied that good results do follow from instruction, and that there has been a great improvement in the matter of the six year molars in the past few years.

Dr. Mowbray:—Regards the question of giving medicine to influence teeth a serious one; alkalies tend to constipation. If we find diseased blood, grants that they would be admissible. Thinks we need acids to cleanse away and remove superfluous mucus, especially that diseased or vitiated.

Adjourned to 2 P. M.

SECOND DAY—AFTERNOON SESSION.

Association called to order pursuant to adjournment.

The reading of the minutes was dispensed with.

The consideration of the subject under discussion, Dental Caries, was resumed, and the following paper was read by Dr. Mowbray, of Warsaw:

ODONTOTRIPSIS,

Or odontothripsis, (for these two words express the same meaning), the definition given by Dunglison is "abrasion, or wearing down of the teeth."

This is the result of many causes, a few of which we will review whilst describing this morbid condition.

Every intelligent practitioner has observed these cases, and exam-

ined them with interest. The enamel and substance wearing away by attrition alone excites our surprise.

We find the teeth worn down, sometimes nearly to the pulp, and sensitive if not decidedly painful; discolored—usually a dark brown color; rough and unsightly; having all the requisites to merit the name "disease."

Sometimes it is confined to one side of the mouth, and again both sides suffer alike. Usually the teeth are free from caries. The disease is generally confined to the antagonizing portion of the teeth, the grinding surfaces of the molars and bicuspids and the posterior surface of the superior incisors; but occasionally a square occlusion will wear down the upper incisors to the gums.

The disease seems to be confined wholly to the male sex; the cause cannot be assigned to the use of tobacco, yet it may assist to produce this condition in some cases. The disease exists in teeth when the patient has never used tobacco; and what is more remarkable, we frequently see it when the patient keeps his teeth sufficiently clean for their preservation.

I use the word *disease*; the term "disease" expresses an opposite state to that of health, consisting in a change either in the position or structure of parts, or in the exercise of one or more of their functions, or in both."*

Is odontotripsis idiopathic or symptomatic? This disease presents the best illustration of atrophy ever seen in the teeth. I am inclined to the view that this condition is not idiopathic, from the fact atrophy is generally symptomatic.

Structural disease can often be traced, and is generally attributed to defective nutrition.

Odontotripsis is the result of diminished and perverted nutrition; both may unite in producing it, yet the former is probably most frequently the true cause. Various things may assist to bring about this condition.

It seems obvious in a majority of cases that perverted nutrition is induced by vitiated secretions of the mouth and stomach, arising from severe constitutional disorders; or to the continued administration of different kinds of medicines—particularly the injudicious and careless use of acid medicines, the direct effect of which is to soften the enamel and injure the teeth. It is well known that the phosphates that

* *Vide* Dunglison's Dic. Med. Sci., p. 315.

enter largely into the composition of the teeth, are insoluble in water, but are readily dissolved by any dilute acid.

An acid condition of the saliva is abnormal, and, as a matter of course, tends to soften the structure of the teeth. Defective secretion of the gastric acids, which is almost constantly an attendant of the dyspeptic diathesis, and which also frequently attends other disordered conditions of the stomach, may well be suspected as a sympathetic, if not an intimate co-partner with the saliva.

Unnatural, partial assimilation is the immediate result of this abnormal condition of the juices of the mouth and stomach; hence, when the teeth fail to receive their proper supply of nutrition they cannot preserve their natural density, and are not able to endure the action of the juices of the mouth or the masticating that the inordinate appetite produced by the dyspeptic, anæmic, or unnatural condition so frequently calls for, without gradual yet serious loss to their structure

Assimilation, to be normal, requires well masticated food as the imperative essential. A healthy stomach and a healthy mouth go hand in hand; both are absolutely necessary to natural assimilation.

The observation of each day is convincing that the greatest cause of Americans losing these organs of the mouth, *is because they do not half masticate their food*, and give each stomach double the burden nature designed for it. Half masticating and over-eating are characteristics of our people.

But we see cases where the wearing down of the teeth is mechanical only. Such cases are usually found in mouths where most of the molars and bicuspids have been lost, and but few of the front teeth remain. A case that illustrates this: A gentleman lost all his back lower teeth, and all his upper teeth except the cuspids, and those were somewhat affected, yet they had done all his masticating for years, and had worn down the lower teeth—cuspid on one side and first bicuspid on the other—half the length of their crowns; The upper fangs were extracted to insert a denture; the cuspids were permitted to remain. The old method of articulating was to bring down the bicuspids on the plate to meet the lower teeth in such a case as this; but such a position of the teeth on a plate is unbecoming and unsightly at best.

To remedy abrasion, purely mechanical, like the case mentioned, the method recommended by Dr. Park, of St. Louis, presents the most merit. We restore the lost part with gold, when a correct and natural occlusion can be easily obtained.

The best method of treating general abrasion of the teeth is yet to be decided. The subject is one that has attracted but little attention.

When but one or two teeth are affected, and the antagonizing teeth are sound, I do not hesitate to file away the antagonizing tooth or teeth, so that the affected tooth or teeth may escape pressure, and have an opportunity to recuperate.

Should the abrasion be general, all the teeth seeming to suffer alike, I would destroy the articulation by making small inverted cone-shaped retaining points in the crowns of the first and second superior bicuspids, and filling them with gold just high enough to relieve the teeth from pressure, then treat the patient constitutionally, and seek to restore the general health and promote assimilation; administer antacids to correct acidity, and use local remedies to neutralize the acid condition of the saliva.

Should this treatment fail to remove sensitiveness, I would then protect the teeth with gold; but in the event of treating this case with success by correcting assimilation the surplus filling can be removed.

How to correct assimilation is a problem of the age, (in the medical world). Medicines are comparatively useless to perform a cure. There can be no rules for diet, farther than the quantity and quality best adapted to each case.

This condition of the teeth is more frequent in anæmic patients—and it might be here mentioned, in those whose saliva is so often of an acid reaction.

The indications for treatment relate to anæmia, if it exists, or to other morbid conditions affecting the system. If anæmia exists, following any disease, or if it has gradually been developing, tonic remedies and a nutritious diet, *long continued*, are highly essential to perform a cure.

The fact that abrasion of the teeth is most frequent with those in the meridian of life, would indicate that nutritious food was needed in greater quantity to supply the demands of the system. Animal food, when properly cooked is easily digested, should be used as often as it is acceptable to the stomach.

If digestion is feeble, pure stimulants may be used to a moderate extent with meals, to stimulate the stomach. If the patient's business is confining, out door exercise is beneficial; in short, *a change in the system and habits of living* will often greatly assist to accomplish the desired end; the more simple our diet and manner of living, the near-

er we approximate nature, and everything natural and normal supplies the system with nutrition, and promotes assimilation.

After the reading of this paper the subject was passed.

The following resolutions, offered by Dr. Wilson, of Aurora, were adopted:

Resolved, That a full report of the discussion of this Society be made and presented annually to each member who has paid all dues.

Resolved, That after the reading of a paper, members be limited to one speech of ten minutes, except by consent of the Chair.

Dr. Kilbourne moved that Dr. Wilson, of Aurora, be appointed reporter for our next meeting. Carried.

The subject next in order, "The Preparation of Foil for Filling Teeth," was taken up.

Dr. Black read the following paper upon this subject:

GOLD FOIL.

The first important question to the dentist after having received his gold foil from the beater or dealer is, how can it best be kept in good working order. If it is not kept in good condition, it matters little how, or in what form it may be prepared, all operations with it will be faulty.

First, then, in learning how best to preserve the working properties of the gold, it becomes important to study intimately those influences which may be injurious, learn, as far as possible, what they are, how they act, and where they come from; then we may find the proper mode of counteracting them. First, we find that gold possessed of good welding properties gradually loses that important requisite by continued exposure to the ordinary atmosphere. In some cases this may be due to dust collecting upon it in such a manner as to prevent the surfaces from coming in intimate contact, thus preventing a union: but we have abundant proof that there is a far more subtle influence than this, and one far more difficult to counteract,—for dust may be excluded with comparative ease.

The fact that gold loses its welding property by exposure to the atmosphere, points us directly to the effects of the gases upon it, espe-

cially those that may be found in the air as impurities; for the reason that by close observation we find that the atmospheric effect differs very materially at different times. You all know how common it is to find your gold, which worked well yesterday, work very badly to-day; Why this difference? is a very important question. It will be my effort to point out some of the causes for these differences, and the remedies, as far as I may be able. In prosecuting this enquiry, I have instituted a long series of experiments, in which I find certain gases neutral, others decidedly injurious, while others again seem possessed of a beneficial action.

Among the neutral gases stand all the simple or elementary gases except chlorine, the action of which is remarkable, and will be briefly considered farther on. Among those detrimental, all those gases containing phosphorus or sulphur stand prominent; while ammoniacal gas seems to stand almost alone as beneficial.

Many substances are neutral which might be supposed to be injurious. For instance, gold foil soaked in tincture of iodine, dried, and then annealed, is rather improved than injured, if any difference. The same is true of carbolic acid, ether, chloroform, alcohol, water, and most other substances usually found about the dentist's case.

The neutral gases need not be considered, but I will notice a few of those of decided action, giving the form of an experiment with each.

Sulphurous acid gas is produced directly from the burning of sulphur in the air, and is composed of one atom of sulphur united to two of oxygen, is possessed of decided acid properties and has the smell of a burning match, and is produced in the dentist's office every time a match is lighted.

Experiment.—A test tube was filled with this gas by heating together oxide of manganese and flowers of sulphur, and some ropes of gold foil, part annealed and part soft, introduced. After standing twenty-four hours it was removed and examined. The soft gold, on being annealed, gave off the gas sufficiently to be very noticeable to the smell, and with a slight crackling sound. The welding property was tried, and although it adhered somewhat it was easily pulled apart again. The annealed gold was found perfectly soft—would not weld any more than so much tissue paper On being re-annealed, it gave off the sulphurous fumes, &c., as the soft gold, but there was no restoration of the welding property by means of heat. You will notice the difference in the action of this gas on annealed and unannealed gold;

and I will state that this distinction was plainly marked in all my experiments with this gas and some of the others. And when I come to speak more particularly of annealing, I will give some reasons why it should be so.

This gas is a dangerous one to the operator, for it is not only produced from burning matches, but is constantly exhaled from all sorts of rubber goods, with which the dentist's office is generally well stocked now-a-days. It is given off in very appreciable quantities in the trimming and finishing of rubber plates, in vulcanizing, and in all the operations with rubber, and wherever it may be. The truth of these statements is easily tested. For this purpose I placed some litmus paper in a drawer containing the rubber used as coffer dam; in a few days it was completely reddened. Some gold placed in the same drawer was affected similarly to that exposed to pure sulphurous acid, though not to so great an extent. In many of our cities the air is often rendered more or less sulphurous by the burning of sulphurous coal, and from other causes the air is often charged with this gas.

It is a somewhat curious fact that sulphur may be wrapped in a rope of gold foil and then burned out without injury to the gold, but this becomes plain when we find that this gas will condense on gold or affect it only at comparatively low temperatures.

Phosphorus Experiment.—A bottle was filled with phosphoric acid by burning phosphorus in oxygen gas, and some ropes of gold foil hung within for a few hours, after which it was examined. The annealed gold was found soft, and re-annealing failed to re-develop the welding property. The unannealed gold also refused to weld after being annealed, even at a bright red heat. After the bottle had remained uncorked ten or twelve hours, more gold was hung in it with precisely the same result. After the bottle had stood for one week more gold was hung in it and the effect found to be the same. Phosphorus is employed in making matches, and is given off in the form of this gas whenever they are burned; it is also formed from the spontaneous combustion of phosphoretted hydrogen gas, which is produced from the decay of animal and vegetable matter, together with sulphuretted hydrogen. Thus we see we cannot consider ourselves entirely free from it at any time, and that it will ruin the welding property of our gold.

Sulphuretted Hydrogen Experiment.—A test tube was filled with sulphuretted hydrogen by decomposing muriatic acid with sul-

phuret of antimony, and some ropes of gold, part annealed part soft, placed within. After twenty-four hours the gold was removed and examined No change in the appearance of the gold was observed. On bringing the rope into a strong alcohol flame there was a distinct crackling sound, and the rope was burst open in a number of places by the escaping gas, which burned visibly. It does not seem to be driven off until a bright red heat is produced. The welding property could in no one of the experiments be reproduced by re-annealing the pre-annealed gold. In some cases there was a feeble show of adhesiveness in the unannealed gold, after annealing, but not enough to be of any practical advantage. After digesting the rope in aqua ammonia for a few minutes and then drying at a gentle heat, a white sublimate is obtained on annealing, which may be collected on a cold glass held above. This is probably the sulphide of ammonia. If any one should be sceptical in regard to the actual condensation of the gases upon gold foil, this experiment must be sufficient proof to do away with all doubts; particularly when a similar phenomenon occurs with some other gases. This gas is exhaled in large quantities from all decaying animal substances and the air generally contains some of it, though the proportion is usually small. But it is clear that it has a tendency to condense upon the gold, and may be collected upon it from the air. And then it may be actually produced in the dentist's office. Blood left in a spittoon over Sunday, or even over night, in warm weather, may exhale enough of this gas to spoil all the gold exposed to its action. It may be exhaled by old teeth, or any animal matter whatever which may by any oversight be left until putrefaction takes place.

The effect produced by burning matches seems to be very irregular; sometimes being that of sulphurous and again that of phosphoric acid, and sometimes different from either. The effect is almost uniformly ruinous on recently annealed gold; but soft gold will sometimes weld after being subjected to it and then annealed, and again it refuses to do so, and again it occasionally happens that ammonia fails to effect a restoration. The ruinous effects of the exhalations from the skin are well known to the profession and need not be dwelt upon in this paper. My experiments confirm the generally received idea that they are always injurious, and further, that if the gold be long exposed to them the welding property will be entirely destroyed.

Many other gases might be mentioned, but I have discovered no others which are liable to be brought in contact with the gold, that exert any decided injurious effect.

Carbonic acid gas softens annealed gold, but the welding property is immediately restored by heat.

Common illuminating gas produces a peculiar spotting of the gold making it look as if mercury had been sprinkled over it; these spots disappear before a moderate heat, and the gold is apparently uninjured.

Ammoniacal gas, or its solution in water, is found to be rather beneficial than otherwise, in its action on gold foil. It condenses on and removes the welding property of cohesive gold, but a very moderate heat will remove the ammonia and cause the cohesiveness to return. When this property is lost by contact with some one of the gases mentioned, the condition may be improved, and the welding property entirely restored in many cases, by treating it with this gas. It will be seen that all those gases which are liable to come in contact with our gold and injure it, are acid gases, which combine readily with ammonia as an alkaline base, to form certain salts. Those containing sulphur form sulphides or sulphates of ammonia, while phosphoric acid forms phosphate of ammonia.

With these facts before us we cannot be at a loss for a moment in regard to its use. If ammonia be present in excess, we may be sure that any of the gases mentioned will be neutralized and our gold perfectly protected.

It thus becomes an ever wakeful watchdog ready to step in at our bidding, take possession of our property and destroy any intruder, before harm can be done, and again deliver it up to us when it may be wanted.

A small bottle of ammonia set in the gold drawer, loosely corked, will be found sufficient to protect our gold from all harm.

Chlorine.—Chlorine gas, from its very decided action, possesses a peculiar interest, although it is not met with in the free state, and therefore is not liable to come in contact with our gold. I will give merely a synopsis of its peculiarities.

A bottle was filled with chlorine gas by the usual method, and a number of sheets of gold, in the form of rope, placed within it. After a few hours they were examined; the lustre of the gold was very perceptibly changed, being dull and of a different shade of yellow; when brought in contact with the skin a deep stain was produced, resembling that of iodine; the instrument with which it is handled turns black; litmus paper is reddened quickly when both are dry; damp litmus, bottled with it in a clear bottle, is first reddened, then turns

almost white; paper dampened with a solution of iodide of potassium and starch, is first blackened, but afterward shows a variety of colors, among which a very brilliant yellow is conspicuous; a piece of black velvet was changed to a very light brown; a small piece of the same was put into a very small tube and the gold pressed in against it—after a few hours it was almost a clear white; the same was repeated with the gold and cloth perfectly dry—several days were required to produce the same result. The welding property of the gold was entirely lost, but was completely restored by re-annealing; when heated to redness a copious green flame is given off, which turns red when the heat is intense, presenting a beautiful appearance. When soaked in aqua ammonia, slowly dried, and then annealed, a white sublimate is obtained, which may be collected upon a cold glass held above—a single sheet of gold giving off enough to form a complete crust over a space of two to three inches in circumference; this substance is probably the chloro-hydrate of ammonia. When a little water is poured over the gold in a test tube, it takes a yellowish color, almost identical with that of olive oil. I find that on the addition of water, the chlorine instantly attacks the gold and dissolves a portion of it, which it carries into the water, giving rise to this peculiar color; pure chlorine water is almost perfectly clear. Gold subjected to any of the sulphur gases, is cleaned and the welding property restored by subjecting it to chlorine and then annealing; but it fails in case of phosphoric acid.

I had hoped, in the first of my experiments with this gas, that gold treated with it might be employed for the purpose of bleaching discolored teeth, but the fact of its carrying a portion of the gold with it when moisture is present, precludes its use, on account of the brownish stain imparted by the gold. I hope this difficulty may be overcome, thus giving us a safe and efficient bleaching agent, which may be used without the least inconvenience to the patient.

Annealing.—The annealing of gold has received considerable attention from the profession, but perhaps not quite as much as it deserves, considering its great importance. The changes effected in gold foil by heat have been differently explained by different persons, and as yet there seems to be no received or fully accepted theory in regard to it. It is true we all know that the direct effect of annealing is to develop the welding property, and if this fails we conclude that there is something wrong with the gold; it has been thought that heat acted upon the arrangement of the atoms of the metal, producing such

a condition that when brought into contact with a similar arrangement the particles composing the two surfaces would interlock, and be held firmly together. This theory might seem to be supported by the fact that heat applied to large pieces of gold, or to plate, has the effect to soften them, evidently producing some molecular change—yet that there is another cause for the development of this peculiar property, I think is fully proven by the effects of the gases.

The welding of pure gold foil is prevented by the gases being condensed on its surface, thereby preventing intimate contact; the direct effect of annealing is to drive off such gases, and render the surfaces clean. To prove this, take a rope of gold foil, anneal it in a bath of dry carbonic acid gas for an hour or more; upon trial its cohesiveness is gone, you may put as much force upon it as you like, it will not weld, but is perhaps much softer than before annealing; bring this piece again under the influence of the ordinary annealing heat and the property returns at once and as perfectly as before

This experiment may be varied by substituting other gases for the carbonic acid with a like result; some of the gases, however, refuse to be entirely driven off by the ordinary annealing heat, and if we experiment with them, the welding property does not return, as we have seen in the foregoing.

In case of chlorine the condensation is so great as to perceptibly change the color of the metal, and when expelled by heat the voluminous green flame gives us the idea of a very considerable condensation While the gas is on the gold it is perfectly soft — will not stick together any more than tissue paper, though it might have been in a fine cohesive state only a few minutes before; as soon as the gas is driven off the property returns.

There seems to be a question as to the best heat for annealing. This, in my opinion, will depend entirely on the gas that may have possession of its surface. If it be carbonic acid — which is usually the case — the heat need not be raised quite to redness, for we find that gas to be driven off at a low temperature; if it be sulphuric acid it should be heated as hot as possible without melting the gold, and kept so for some minutes, and even then it may not be perfectly cleaned. This is very much like the melting point of metals, or the boiling point of liquids—some melt at one point some at another; some liquids boil at one point and some at another. It is the same with the gases on gold, some are drawn off at a low temperature while with some others the metal must actually melt before they leave it.

The gases do not leave the gold instantly at a given temperature, but the first is expelled at a comparatively low heat, and they continue to leave it as the heat rises until they are completely driven off. This enables us to acquire any degree of adhesiveness we may desire. Some parts of a filling may best be made of non-adhesive gold, while other parts require a perfectly coherent mass. By practice, all the gradations of adhesiveness may be attained and used with perfect facility; for this reason the alcohol flame and the annealing of each piece of gold as it may be wanted for use, is to be preferred over all other methods.

It has become a custom to say that annealing gold hardens it. This is only true in appearance; the gold is actually softened, just as it is in plate. The gold appears stiffer for the reason that the laminæ of foil stick together whenever they come in contact, instead of sliding easily upon each other as in the case of unannealed gold; this gives the impression of increased hardness, while the facts are just the reverse.

The use of gold rendered adhesive by the beater seems to me to be unadvisable, for the reason that such gold is affected more and easier by deleterious agents in the air than soft gold. In all my experiments there has been a marked difference in the intensity and quickness of action of the gases on annealed and unannealed gold; the recently annealed gold always suffering most. This is explained by the fact that any deleterious gases coming in contact with it find its surface and its pores (if they exist,) unoccupied and consequently no resistance to its action. All plastic golds are affected by the gases to a far greater extent than foils, for the reason that their structure is so much better calculated to absorb and retain them. This needs no farther explanation — being palpable to every one; it makes the great difficulty of keeping these forms of gold in good working condition quite clear. I think that if those preparing this form would keep it strongly scented with ammonia, and the dentist do the same, until it is ready to be annealed preparatory to using, this difficulty would be entirely overcome.

Forms of Gold.—A few words may be said of the manner of handling and forming the pieces of gold. This may be stated as a positive rule to which there should be no exception: That gold foil, the welding property of which is to be made use of, should never be touched with bare fingers, for the reason that the exhalations from the skin always injure this property more or less. The gold is easiest and most

perfectly worked with the fingers neatly gloved with fine chamois skin or linen. These gloves should not remain on the hand any longer than is actually necessary to do the work, and should be very carefully kept. It may be thought that it would be inconvenient to handle the gold in them, but this soon wears away with practice and becomes easier and the results more satisfactory than with any of the gold crumpers that I have seen. I notice some ingenious Yankee has gotten up a patent instrument for rolling up the ropes, which consists of two boards with a strip of rubber stretched between. This may produce a very nice rope, but after studying the effects of rubber on gold, I should not prefer it to the fingers. We should remember that it is not moisture merely that injures our gold, for that is driven off by annealing; but it is the gases and solid residue from these exhalations, compared with which the sulphurous acid exhaled on rubbing rubber is no improvement. I would kindly suggest that he substitute a nice piece of chamois skin in place of the rubber.

The Block. This form is best made by taking the amount of gold wanted in a single piece, and crumpling it loosely together, and then bringing it into a square form with a pair of flat bladed thumb pliers. The whole operation should be conducted in such a manner that the finished block will be of equal density throughout.

Ovoid Pellets are made in the same manner as the block, except that they are rolled to the desired size and shape—round or oblong—with the gloved fingers.

The Rope is made by folding a sheet or part of a sheet of gold loosely together into a long round roll, and then twisting it into a moderately compact rope. It is also made by rolling the gold in a napkin, and by crumpers, but much the best form is produced by the fingers gloved with chamois skin or linen.

The Pellet is produced by cutting the *Rope* into short lengths. I am using a pair of shears prepared with a graduated scale attached to one of the blades, with which the length of each pellet is definitely and easily measured as it is cut, without any loss of time whatever. This is a very convenient and useful instrument to those who may wish to adopt definite sizes of the pellet.

The Ribbon is best produced by using two prism shaped blocks of convenient lengths, (one side about half the length of each of the others is the most convenient form). A paper knife or ivory spatula may be used instead of the second block. The gold is laid on a piece

of velvet, the thin edge of one of the blocks placed on its centre—the second block is now passed under the edge of the sheet, which is folded over the first, which is withdrawn, and the gold brought down smoothly by passing the block over it. This operation is repeated until the desired width is obtained, and the ribbon is ready for use. I know of no other mode of producing ribbon which can compare with this for perfection or ease to the operator.

The Cylinder is made by rolling a ribbon smoothly and compactly upon a broach or four-sided drill, as a ribbon is rolled upon a block, then by rolling the broach or drill backward it is loosened, and the cylinder removed. The width of the ribbon should equal the desired length of the cylinder. Many other forms have been used, more or less, but they are generally modifications of those given, and hardly require separate consideration.

The form in which gold foil may best be used in filling teeth, is a question of no small importance, and deserves much careful consideration. We want that form which may best be impacted securely and perfectly into grooves and retaining pits, and against the walls of the cavity. Compared with these points solidity itself is a secondary consideration. If our form of foil should not admit of the ready accomplishment of these objects, our whole work is liable to fail, no matter how solid other parts of the filling may be, or how beautiful it may appear. To meet these requirements our form of gold should be very impressible, and take readily the form of the wall of the cavity against which it may be impacted. These requirements seem to be most perfectly met by the form of the block. This form of gold is soft and sponge-like, may be pulled this way or pushed that way with the plugger, and adapts itself most perfectly to the walls of the cavity, but has the objection that it requires more labor to consolidate it perfectly than most other forms, on account of the many wrinkles and sharp angles which must be beaten out. This objection is perhaps much greater in theory than in actual practice, and whether it is or not, the impaction against the walls is of much more importance, as before stated, than the actual solidity of the body of the work ; provided always, that the solidity is sufficient for the ordinary wear and tear of mastication, which is easily attained with these blocks. The working of the ovoid pellet is about the same as the block. The next form nearest resembling the block is the pellet. This form is not crumpled quite so much as the block, yet is almost as soft, and is well adapted to working into

small cavities or retaining pits, grooves and undercuts. The use of pellets cut from ropes larger than these made from a single sheet of No. 4 gold is objectionable, on account of the condensation which occurs at the ends of the pellets in cutting them. The ease and rapidity with which they may be prepared is quite an item in their favor, in all cases where small pieces are needed. The rope has been much used in times past by beginning with one end and folding it into the cavity, condensing each fold as it is laid in. I think this practice is mostly abandoned on account of the obvious difficulty of keeping the rope free from the moisture of the mouth, and that it obscures the cavity too much.

The cylinder is a very popular form of gold with many operators, and seems to have been gaining ground for a number of years. It is used by setting it on end in the cavity to be filled, and condensing against one of its walls, or if it be an approximal cavity, by laying the end of the cylinder out over the wall. With this form of gold there are no angles to break down in condensing, so that the solidity is attained with less labor than with most other forms in use. In fact, the gold is placed in the cavity in a very smooth and compact state, so that little more condensation is required, and is generally used in pretty large masses, particularly if the cavity be large. It is not so easily impacted into any irregularities which may occur in the walls of the cavity, although in the main very great solidity is attained. At those points along the wall where two cylinders lie against each other, triangular openings are liable to occur. In case of approximal cavities where the plan is to lay the ends of the cylinders out over the walls, this may result in serious mischief. This may be illustrated by taking three little rolls or cylinders of paper, with square ends, and placing them together a triangular opening will be observed in the center; or if you take two of them and press them together against a flat surface, a similar opening will be observed between them. It will be found a very difficult matter to close these openings perfectly and solidly by any practical amount of pressure. If the space be filled at all it is apt to be filled very loosely. The difficulty is not lessened by substituting gold for paper, and I consider it a very grave objection to the general use of cylinders in filling teeth, especially in approximal cavities. I have myself been greatly mortified to find fillings which I had thought very perfect, imbibing moisture, causing decay to start, evidently from this cause; and have also noticed it in fillings made by

some very fine operators. To overcome this trouble, requires considerable manipulative skill, and much good judgment, and even then it seems to be a somewhat dangerous form of gold to use largely.

The ribbon cut in short lengths or folded in as rope, may be used in filling teeth; but is scarcely applicable to the filling of cavities, for the reason that it is too much condensed, and too many hard corners are liable to occur to allow it to be spread and impacted perfectly against the walls of the cavity. This form of gold cut into convenient lengths may be used with great advantage in building up lost parts of teeth, after the cavity has been filled out even with the walls. In such cases the slips may be laid on smoothly, and condensed with less labor than any other form of gold. There seems to be very little attention paid by dentists to the size of the pieces of gold used; or I should say, they do not adopt any regular system of sizes, but prepare their gold according to the size of the cavity to be filled. Now to prepare gold in such a manner as this, seems to me to be forever experimenting with vague and undefined sizes And we cannot feel that degree of confidence and thorough knowledge of what is coming under our instrument that we should. I would recommend every operator to adopt some regular gradation of sizes which may be found convenient, and adhere to them closely in all their work.

A few weeks observation will be sufficient to determine upon those sizes which will be most convenient for their range of operations. Then a known and fixed size of gold will be chosen to be worked to a given place as the eye may dictate, and there will be no vagueness as to the working of the piece under the instrument, for it will be perfectly familiar. Those who have not tried this plan will be surprised at the relief it will afford in all difficult operations. Instead of feeling their way along with perhaps some misgivings as to whether the gold prepared is going to suit the situation all the way through, they feel that they have definite and familiar sizes of gold at hand, at once adaptable to any situation; a view of which is always sufficient to determine the size or form to be taken. The adoption of such a system will be of no small advantage to those writing and speaking upon the subject, in making themselves understood, or in conveying a distinct idea of their plans to their brothers; for it is often the case that the size of the gold is as important as the form. We all perhaps feel how indistinctly our idea of the size of gold used in any given case is conveyed in any form of words used by the profession. We need some

system by which an accurate idea of this kind may be easily expressed and generally understood. Then much of the vagueness which hangs around our operations when put in the form of words, would disappear. But such a state of things cannot possibly occur when operators cannot tell in words what size the pieces of gold used in such and such an operation should be. The plan which I have adopted, and which perhaps is as simple and as easily understood by all as any other, is that of naming each piece according to the number of grains, or the fraction of a grain contained in a piece. Thus if a sheet of No. 4 foil be cut into four equal parts, and each part be made into a block, they will be called one grain blocks; if it be divided into eight equal parts they will be half grain pieces. No. 2 gold divided as the last will make one-fourth grain pieces. A sheet of No. 4 gold would make a four grain block, or cylinder; a half sheet would make a two grain piece; and so on throughout all sizes that may be wanted. One number of foil is adapted to this system as well as another, and it is applied to all forms of gold alike. This plan presents an unlimited variety of sizes, a very few of which, when properly selected, will be found sufficient for any operation. Any one using any selection of these will understand readily what is meant when any one of them may be mentioned, whether they be sizes he is in the habit of using or not.

I am using half a dozen of these in my office for general use: 1 grain, $\frac{3}{4}$ grain and $\frac{1}{2}$ grain in the form of blocks, and $\frac{1}{3}$, $\frac{1}{4}$ and $\frac{1}{8}$ of a grain in the form of the pellet, and occasionally some of larger or smaller size. But in whatever form my gold is prepared, it always takes these definite proportions.

I find this system very convenient in directing my assistant in the gold I may want; and, in fact, it is a convenience in every way you may put it.

The preparation of gold I make entirely the work of my assistant. She has her chamois skin gloves and all the necessary instruments in a convenient drawer, and whatever else goes wrong, every piece of gold that comes to the tray to be used must be just right. And I have no hesitation in saying that it may be done as well, and often better, by a properly instructed assistant than the operator would do it for himself. And more than this, I have my assistant do all my annealing. For this purpose she is supplied with some annealing forks, which are made by flattening an old excavator, splitting it up with a separating file and sharpening the points. This will stick into any piece of gold.

and hold it without condensing it, and is preferable to the foil pliers in general use. With one of these instruments she takes such a number and form as I may call for, passes it through the alcohol flame and then into the cavity to be filled, when I take it with my plugger. And while I may be fixing it for the final condensation she has taken up and annealed another piece, which is held while the first is condensed with the mallet, she always bringing the number called, and annealing lightly or otherwise as may be directed. The position each should occupy in the cavity is pointed out by a slight motion of the point of the plugger over the spot.

I find this plan to work smoothly and well, and saves much valuable time in the annealing of the gold.

We started out with our gold foil at the time when it was received in good condition from the beater and dealer. We have been with it through that often dangerous interval which has been spent in the gold drawer, awaiting quietly its work of protection to some once beautiful and pearly organ of mastication, undergoing a slow destruction by the unrelenting destroyer. We have kept watch, as well as our feeble powers would admit, for those intruders which might endanger its usefulness, and have done our best to baffle their designs. We have seen the time roll round when it has been called to duty, and have watched anxiously while it has been made to take the forms best adapted to the peculiar duty assigned it. And have at last seen it nestled away solidly and snugly in the home invitingly made for it by the dispossessed monster, DENTAL CARIES.

Dr. French moved that the dentists present be invited to take part in the discussion. Carried.

Dr. Rivers moved that Drs. J. B. Morrison, A. W. Morrison, and H. S. Chase, of St. Louis, and T. H. A. Brewer, of Palmyra, be made honorary members of the Society. Carried.

Dr. Cushing moved that a committee of three be appointed by the chair to confer with the publishers of the *Missouri Dental Journal* as to publishing of the proceedings. Carried. Wilson, Cushing and Black appointed.

SECOND DAY—EVENING SESSION.

The next subject, "Filling Teeth," was then taken up.

Dr. Cushing read the following paper:

FILLING TEETH.

Mr. President: —The subject assigned to me for this occasion, "Filling Teeth —special points to be observed to secure success," is one the importance of which is evidently not properly appreciated. The remark is often heard at our Society meetings when this subject is announced, "Oh, that has been discussed till it is worn out!" Is it not fair to presume that persons making such remarks are indifferent operators, and have no just appreciation of this subject — and may it not be stated as a self-evident proposition that no one thing in the round of our professional duties is so poorly performed, as a rule, as this same operation of filling teeth, and granting this, is it not clear that there is no subject which so much needs to be discussed?

In treating of this subject under the general head of "Filling Teeth," of course but brief notice can be taken of some of the most prominent points of it, as to treat it thoroughly would profitably occupy the time of this Society during more than the entire period of its annual session.

Let us first state in general terms the object of filling teeth, and the method of attaining that object.

The object is to restore diseased and broken down teeth to an approximate degree of health and usefulness, and to so preserve them, and it is attained by replacing diseased and broken down tooth substance with a material which shall prove indestructible, which shall be impervious to air and moisture, and which shall be so nicely adapted to the sound parts of the tooth at every point that air and moisture cannot find access between the filling and the enamel or dentine. This briefly is what teeth are filled for, and how they should be filled.

Now, in our observation of the majority of operations which fall under our eye, does it seem that this proposition as to the object of filling teeth, and the proper method of gaining that end, is generally accepted as the true one? On the contrary, are we not almost forced to the conclusion, judging by the character of their operations, that some men seem to think that there is some medicinal or curative property in the gold, and that the metal only need be kept in approx-

imal relation to the tooth in order to secure immunity from decay, or farther destruction. Hence a filling — so-called — which will not drop out is apparently regarded as the grand desideratum, no matter how imperfectly it may be adapted to the walls and edges of the cavity of decay. Does not the experience of every gentleman present bear witness to the truth of this proposition?

It must be apparent to all who understand the nature of the diseases and destruction of the teeth, and their proper treatment, that a very large number of our profession do not in their operations approach at all nearly to the requirements of the case.

It was said that judging by their operations, we should come to the conclusions just stated, but it would be eminently unjust to judge all who are the authors of such operations in this manner; very many of them doubtless understand theoretically what is needed, and do the best they can to secure the desired end, but from want of proper education, and of opportunities for witnessing thorough operations, they do not know how to do better. Clearly then, if by discussion we can throw any light upon this subject, or help any to even slight improvement, it is our duty to discuss, and farther to demonstrate by clinics or in any other way, the best methods of producing thorough operations.

There is one thing which it may not be inappropriate to mention just here, though not precisely pertinent to the subject, and that is, that the public, as a rule, take this same view of the matter, that is, thinking that a plug that does not drop out is all right, while it may be proving vastly more harmful than the untouched cavity of decay would have proved. This being the case, the ignorant or unprincipled practitioner is tempted to impose upon his patients through their inability to defend themselves, owing to their want of knowledge as to what constitutes a good operation.

Where imposition may be practiced with such facility, and where men are devoid of principle as well as of proper ambition to excel, the incentive to improvement will too often be outweighed by the greed of gain.

Coming now to speak of the special points to be observed to ensure success, it is somewhat difficult to discriminate, where every point requires to be carefully observed. There are, however, some which claim more particular attention than others, and they will be briefly referred to. Of course it is to be presumed that we are speaking of

teeth that are in proper condition to be filled. Then, of course, the first point claiming attention is the shaping the cavity, in which two objects are to be kept always in view: First, the removal of every particle of the affected dentine and enamel at the edges, Second, the shaping the cavity in such manner as may most securely retain the gold, giving at the same time greatest security to the edges, while the cutting away of the tooth shall approach as little as possible the immediate region of the pulp and its prolongations. Doubtless this seems to some minds so obvious a proposition, and the thing so easy of accomplishment, that they will be disposed to exclaim in the language quoted at the opening of this paper, "oh that has been talked about till it is worn out," but it is painfully evident that this matter is too little understood and practiced by the mass of the profession, and is sometimes a thing by no means easy of accomplishment. As a rule it is perhaps safe to say — always cut away all overhanging edges of enamel, especially upon the grinding surfaces of teeth, until you have a good sound margin of enamel well protected by sufficient sound dentine beneath it, to give it firm support and nourishment as well. Undoubtedly the best shape which the cavity can have, is that in which the walls shall be nearly parallel, the cavity only slightly larger at its base than at its outer aspect. But this cannot always be secured, and then the next best thing should be done; good retaining points should be drilled where opportunity offers, care being observed not to make them in too close proximity to the pulp. In approximal cavities it is desirable if possible to secure a foundation at the wall of the cavity nearest the neck of the tooth, which shall present a plane surface at right angles with the line of the vertical diameter of the cavity, avoiding always as much as possible concave surfaces as starting points. Retaining points at the angles are always desirable as they enable the operator to secure his starting point with less trouble than otherwise he might have; next to be considered is the point, which, in shaping and excavating the cavity is most frequently neglected, and which may perhaps with propriety be called the most important one in that part of the operation, and that is the careful shaping and smoothing of the edges of the cavity. In very many cases operations prove worthless from a neglect in this particular, which in every other respect are first class. The edges of the cavity should always be thoroughly sound, no particle of imperfect enamel or dentine being left, and should be beveled outwardly, and thoroughly smoothed.

Great care should be bestowed upon this part of the operation, especially in preparing the edge at the neck of the tooth. A magnifying glass will be found of great service wherever it can be used, in showing us defects and imperfections, both in the teeth and in our fillings, which the unassisted eye could not discover. In fact such a glass is indispensable where the highest attainment is sought after; every one who does not use such a glass should procure one immediately. Those who have never used them will be surprised at the revelations the glass will make, and the character of their operations can hardly fail to be improved if they use this assistant thoroughly, and seek to profit by the lessons it will teach.

In approximal cavities which extend into the crown, great care should be observed to have the edges strong and smooth at the exposed corner where the force in masticating would be so liable to break frail edges away. In crown cavities great care is necessary in following out all the fissures to be sure that they are entirely cut out and the edges thoroughly smoothed and leveled. Here again the magnifying glass will bé found of great service, showing us sometimes imperfections which would otherwise escape the observation of the keenest sight. In approximal cavities in the six superior anterior teeth, these edges upon the lingual aspect of these teeth should be carefully removed, as, if allowed to remain, they are almost certain to be broken away, no matter how carefully filled the teeth may be, by the ordinary use to which the teeth will be subjected. So too in approximal cavities in the bicuspids, as a general rule, unless the cavity is very small, and situated near the neck of the tooth — the fissure across the tooth had better be cut through thoroughly into the approximal cavity—making a compound cavity of it — as their edges in this situation (even when they do not seem so very thin,) are pretty sure to be broken away sooner or later, necessitating the renewal of the operation. In cutting across the crown of the bicuspids, where the cavity is a compound one it is well to shape that portion in the crown so that it shall spread a little laterally at that portion away from the edge, thus making a dove-tail, which will be a very great additional security to the filling. These are the principal points to be observed in the preparation of the cavity. The next important thing to be observed preparatory to filling is the securing the absolute dryness of the cavity, however that end may be attained; in a majority of cases this will be best secured by means of the rubber dam — while in some cases it would doubtless be

impossible to secure this most important condition in any other manner. The rubber dam is especially reliable in approximal cavities, and it is better to use it in all cases where it can be applied. All those who have never tried this method, or having tried it and failed to make it work, have thrown it aside as impracticable, should be most strenuously urged to persevere in the effort to make use of this, one of the greatest and most efficient assistants to thorough and successful operations which has ever been devised, and for which the profession cannot be too gratefully thankful, or its author too highly commended.

Supposing this condition of dryness to be secured, it only remains to speak of two or three points touching the placing of the gold in the cavity and the final process of the operation, which are the most frequently neglected.

We will speak particularly of approximal cavities, as being those which are most difficult to fill; of course the same principles will be applicable to all teeth, and all cavities. First to be considered is the foundation for the plug, first in importance, as well as in the order of its performance; as was stated before in speaking of the preparation of the cavity, "retaining points" at the outer and inner angles are desirable. These being carefully filled, the gold can be easily carried across the base of the cavity; adhesive gold is referred to here, though if soft or non-adhesive gold be used, the retaining points will be valuable still, as an assistance in fixing the foundation. At this point, probably, more failures occur than at any other in the operation; that is, in securing of perfect covering and consolidation of the gold at the margin nearest the neck of the tooth; the greatest care is absolutely essential here, as upon the thoroughness of the operation at this step largely depends the value of the whole. The gold should be carefully placed, overlapping the edge of the cavity sufficiently to admit of thoroughly covering all that is sought to be covered, and gently worked over the beveled edge till that is thoroughly covered and uniformly condensed. This can perhaps be best accomplished by the use of a properly adapted foot-shaped plugger, and by rolling it upon the gold over the edge of the cavity, from within outwardly. The first few pieces of gold should not be too thick or massive, as thereby less certainty will exist as to its adaptation to the cervical wall and particularly to the margin; nor should very great force be used until the parts are all carefully covered, as too great force tends to tear away the gold from the main body within the cavity, thus rendering the

margin of the filling very imperfect. After this edge is carefully protected, then larger portions of gold may be used and greater force employed in consolidating it; it is of great importance that the gold should be equally well adapted to the margins of the cavity throughout, and that it should be uniformly condensed; finally, the plug should be carefully finished down so that there shall be no particle of gold projecting anywhere at the margins, and then both plug and tooth should be carefully and thoroughly polished, particularly at the point nearest the gum, exercising always great care not to wound or bruise the gum unnecessarily.

These would seem to be the most obvious points "specially to be observed to secure success," but no one should entertain the idea that *any* part of the operation can be neglected with impunity; every step should be carefully and conscientiously taken, in the most thorough manner possible to the operator, and then successful operations may be reasonably looked for. In closing this brief paper, it should be remarked that the best descriptions of the best methods cannot be half so convincing or instructive as clinical demonstration.

One operation carefully observed will prove more valuable as an instructor than a dozen written essays, and consequently it is clearly the duty of us all to improve every opportunity to witness thorough operations, that we may reach the highest possible degree of skill. Still the attention of some may be called by these brief remarks, to some of the more frequent causes of failure, and they be led thereby to avoid them in the future. Should this prove the case, the purpose of this paper will have been accomplished.

Dr. French:—proposed to read all the papers and then return to the subjects for discussion. Decided by the Chair contrary to rule.

Dr. Crouse:—thinks the paper read by Dr. Cushing covered, generally speaking, the whole ground. Thinks an important point in filling teeth is to get sufficient room, which is accomplished in several ways. Front teeth are separated by wedging with pine wedge, or rubber: find wood the best and most pleasant to the patient. Wedges must be changed often, and not put in too tight. Thinks the form of gold of but little importance compared with proper manipulations in the tooth. Prepares his

gold by tearing off from the sheet enough for one block the desired size, then doubles it up with fingers, or a pair of pliers, and by giving it a squeeze on each side with the pliers, makes it into the shape of a block, thus having it more together, and avoids cutting it with scissors, as is the case with pellets. Thinks adhesive foil has produced many failures. Uses his foil less annealed now than a year ago. Thinks adhesive foil blocks the cavity, and prefers soft foil; uses both, however, in most cavities. Thinks undercuts can not be reached by adhesive foil. Has seen failures in his own operations from the use of adhesive foil.

Dr. Edwards:—Inquired whether the required space cannot be obtained as satisfactorily in a short time as by waiting several days.

Dr. Crouse:—Said if he was the patient he should say it would not be as satisfactory to *him*, on account of the pain.

Dr. Edwards:—Inquires if as much discomfort is not produced by soreness as by rapid wedging.

Dr. Crouse:—Said he could separate without soreness by taking time enough.

Dr. Mowbray:—Thinks there is a great difference in the condition of mouths and teeth. Some bear rubber and cotton better than wedges of a harder substance, but is opposed to the use of cotton and rubber as a general rule, having found wedges made of second growth hickory much more satisfactory.

Dr. Chase:—Finds that rapid wedging is much more satisfactory to patient and operator. Numbness ensues after the first wedge. If the cavities are small and no room apparent, would still wedge, beginning between the centrals, then between the central and lateral and lateral cuspid; then removing these, inserts others thicker nearer the gum, and gets room enough where there appears no room. If cavities are small and inaccessible, would use a small drill near the gum rather than file. Many cavities may be approached from the lingual surface by cutting. Was pleased with the paper of Dr. Black, and thinks it shows much labor, and that there is no danger of knowing too much on these matters. In St. Louis and other cities the atmosphere is charged with sulphurous gas from coal used, especially in winter,

but does not know that the dentists there complain of non-adhesiveness of gold. Thinks Dr. Black's ideas of system in cutting pellets is very good. Has himself a box with eight or nine compartments for different sizes of gold, some for cylinders, adhesive and non-adhesive, some thick and some thinner. Bicuspids having approximal cavities with fissures extending to the grinding surface, should be well opened, but would not in all cases cut away all overhanging enamel. Perhaps the mallet cannot be used, but we should at these points use hand pressure. Thinks both adhesive and non-adhesive foil useful, but has no idea of dispensing with adhesive. In cylinders prefers non-adhesive foil—that which can be rendered adhesive by annealing. Thinks soft foil valuable in beginning a filling, and uses it in the form of a large pellet which will just go into the cavity, to which he adds small pieces of adhesive foil.

Dr. Matteson:—Inquired in regard to crystal gold.

Dr. Kilburne:—Gave his experience with Morgan's plastic gold. Was much pleased with it at first, and thought foil would soon be laid aside. Filled three cavities which he built out, but patients returned with the fillings in their hands, and the cavities appeared as if acid had been applied. Laid aside the material and filled the cavity with foil, which proved a success. Thinks if it could be produced pure it would be valuable, but that it does not fill the indications.

Dr. Mowbray:—Referred to a case in which he filled several teeth a year or two since, with Watt's crystal gold, where there was not a single filling perfect. Thinks a perfect filling can not be made of it, at least without great labor.

Dr. Matteson:—Used Watt's crystal in small quantities, condensing as he goes.

Dr. Eames:—The use of crystal gold has been almost entirely given up by the better class of dentists in St. Louis. We have learned from sad experience that it requires a greater amount of time and care to produce satisfactory results with crystal or sponge gold than with the ordinary foils. The difficulty seems to be in securing perfect adaptation to every portion of the wall of the cavity and a perfect border to the filling. Likes soft

foil, in connection with adhesive foil, especially in large approximal cavities; can secure a better adaptation to the walls of the cavity than with adhesive gold alone. In separating, does it at once, unless the patient objects; then takes more time. Thinks care should be observed in the use of the wedge, especially in separating the central incisors of young patients, as the maxillary bones may be easily separated. Uses the file and chisel more freely than formerly in preparing approximal cavities in molars and bicuspids. The fact that a large majority of failures in this class of fillings is found to be when there has been little or no separation of the teeth, is a strong argument in favor of a free separation. Would in every case cut away the tooth sufficient to secure a firm border, and enable him to properly prepare and finish the cervical wall and border of the filling.

Dr. Kilburne:—Thinks ninety-nine-hundredths of our failures in proximal cavities are from want of space. If the file is necessary he uses it, and to such an extent that the teeth will not come together again. Thinks his patients are better satisfied with fast wedging than slow. Many patients cannot wait for the wedging. Uses the file first and then wedges.

Dr. Mowbray:—Spoke against V shaped cavities, having one in his own mouth.

Dr. Cushing:—Explained his remarks on the fissures in bicuspids. Would not wish to be understood as leaving the enamel frail.

Dr. Eames:—Thinks the discomforts of V shaped separations alluded to by Dr. Mowbray can be easily remedied by carrying the separation up to the gum.

Dr. Black:—Does not think that the coming together of proximal cavities will injure his fillings, provided the cavities are properly prepared. The enamel should be cut away at the cervical wall and toward the labial and buccal surfaces, so that the filling may be supported by a solid margin. Thinks gold should be prepared with much care, and would fear to trust those who manifest a disposition to slight this point. Thinks sponge gold difficult to make satisfactory about the margins. Has used it as foundation for fillings, but now uses soft foil, as the sponge is

more affected by the gases. There are various opinions as to the sponge. Likes the idea of Dr. Eames of lining the cavities of soft teeth with soft foil; it will be more easily adapted to the walls of the cavity.

Dr. Park :—Being called for, said he never used but one box of sponge gold, which was very satisfactory, but abandoned it on account of the greater care and length of time required.

Dr. Kitchen :—Inquired if Dr. Judd used sponge in connection with foil.

Dr. Eames:—Said he did, but not at the border of the filling.

Dr. Rivers:—Thought sponge gold could be successfully used, but it took too much time. Liked it for the lining of frail cavities and for fine points and fissures; uses it in large pieces where there is danger of moisture. Thinks it ought not to be recommended, as inexperienced operators are apt to rely upon it in difficult cases, but such usually find their fillings failing in a short time.

Adjourned to 8 o'clock, P. M.

SECOND DAY—THIRD SESSION.

The subject of Filling Teeth, Special Points to be observed to insure Success, was still under consideration.

Dr. Porre:—Believes in a separation that will be permanent but not so wide as to be annoying. Cuts through from the crown rather than wedge too much. Working by faith has about ceased. The parts cut away should be restored with gold. With crystal gold has met with similar results to those already spoken of, and has abandoned its use, thinking it can not be made solid at the edges.

Dr. Morrison :—Prefers foil to crystal gold. Thinks uniformly good operations can be made by confining ourselves to one number of foil. Prepares his cavity by smoothing the edge carefully. Prefers soft foil in many cases.

Dr. Chase:—Explained that V shaped incisions to get at proximal cavities are not recommended by the profession in St. Louis. Thinks that when there is a fissure in these cavities no strength is lost by cutting away, as there is no union between the parts.

Sometimes it is necessary in forming these cavities to remove the enamel, and the shape may be restored with gold.

Dr. French:—Is pleased with the remarks made, and especially that the idea of building out teeth is not practiced. Thinks a bony aspect is preferable to fancy operations. Prefers rapid wedging to separating slowly; secures considerable space in five minutes time. It is easy to fill when adjoining teeth are absent. Thinks the sponge gold was about talked out at Cincinnati. Still there are cases where foil will rock in the bottom of the cavity. Then uses the sponge with success, but does not make complete fillings of it.

Dr. Crouse:—Inquires whether the gentlemen who advocate rapid wedging have had it tried in their own mouths. He *has*, and will not submit to it again, as it is the most painful operation he ever endured. Separate slowly and let the patients speak for themselves.

Dr. Park:—Speaks from experience, and condemns rapid wedging. Has had the maxillary bones in his own case separated, and the separation still remains. Thinks the expression "fancy operations" a misnomer. The operation which restores the contour of the tooth is eminently one of utility. The more closely our operations approach nature's design the better. Contour filling not only serves to afford masticating surface, but strengthens the tooth, and protects the exposed dentine.

Dr. Rivers:—Has experienced the rapid wedging, and is in favor of it, though he thinks he has wedged too rapidly. Does not wedge entirely for space. The wedge keeps away the gums and secretions, and the teeth steady. Has no hesitation in wedging what he thinks proper, and then cuts till he has room.

Dr. French:—Used the term fancy operation in no offensive sense. Refers to cases in which the tooth is more than restored, to the detriment of the appearance of the mouth.

Dr. Crouse:—Asks Dr. Rivers what benefit the patients derive from wedging. Also says that country patients can be induced to return at any time.

Dr. Rivers:—Reiterated his former remarks on the wedge.

The President stated that his views on this subject had been expressed by Dr. Crouse. He condemned rapid wedging.

The next subject in order, Alveolo-Dental Periostitis, was now taken up, and opened by the reading of the following paper by Dr. C. S. Smith:

ALVEOLO-DENTAL PERIOSTITIS—ITS CAUSES, PATHOLOGY, DIAGNOSIS AND THERAPEUTICS.

The disease which is the subject of this paper, is one, a proper understanding of which is of the greatest importance to the dental surgeon. Involving as it does, tissues in that immediate locality of the human organism of which it is the province of the true dentist to assume the entire professional charge, and being in greater or less degree concomitant with almost every form of disease found within the oral cavity, it behooves him to understand thoroughly its causes, nature, symptoms, and remedial indications.

We propose, therefore, to consider as succinctly as possible, the origin and progress of this disease, from its inception to its termination, either by subsidence or resolution, or in the alveolar abscess or fistulous opening; and the proper method of treatment to bring about either of these results, with a view of ultimately restoring the parts to their normal condition.

Alveolo-dental periodontitis, or more properly periodontitis, is, as its name implies, an inflammation of the investing membrane of the root of a tooth. The lining membrane of the alveolus—if, indeed, it be not identical with the dental periosteum—must necessarily be at the same time involved, since two tissues so intimately connected—if two there be—can not but sympathize with each other to a sufficient degree to practically obliterate any theoretical distinctions.

Periodontitis may be divided into acute and chronic. Inflammation in other parts of the body is often spoken of as acute if of less duration than six weeks, but in the present case it usually runs its course in a week or less, after which, if it neither subsides nor increases, it may be termed chronic. We propose to treat at this time only of the acute variety.

In order to a successful treatment of any disease, the practitioner must have an appreciation of all the causes which may produce it, and an intelligent understanding of the steps necessary for a removal of

the cause, as well as of the auxiliary treatment. We shall therefore attempt to give a carefully prepared list of all the causes of which we are cognizant, and the several considerations in regard to the removal of the cause, as well as the other indications of treatment.

Causes. The causes of this disease are numerous. We specify them as follows:

First,—Inflammation of the dental pulp—the inflammation extending to the periosteum by continuity as well as contiguity of tissue.

Second.—Caries, so situated as to impinge upon the cementum. The food and other materials which collect in the cavity, and the ragged edges of the same, produce irritation of the periosteum, which leads to inflammation.

Third.—Mechanical causes, such as blows upon the teeth, and biting upon hard substances.

Fourth.—Salivary calculus impinging upon and creating irritation of the periosteum. This is a very frequent cause.

Fifth,—A protrusion of filling material through the apicial foramen, resulting from improper manipulation; an infrequent cause.

Sixth,—Loose roots, creating irritation and inflammation, as foreign bodies.

Seventh,—Arsenical applications and local irritants.

Eighth,—Improper or imperfect occlusion; a frequent cause.

Ninth,—Excess of plugging material on the grinding surface of a tooth, so that a cusp strikes it.

Tenth.—Action of constitutional influences on the periosteum; as phosphorus, mercury, and syphilitic poison.

Eleventh.—Irritation from dental manipulation, including excision of the pulp.

Twelfth,—But the cause which, if not the most frequent one, as it probably is, is of full as much importance to the dentist as any other, is the presence within the tooth of dead and decomposing pulp tissue.

Symptoms. The symptoms of periodontitis arising from any of the above causes, are nearly the same, varying principally in degree.

The first stage is *soreness of the tooth*, indicating a slight irritation of the periosteum. The result of this is determination of blood, the symptom of which is *uneasiness*, and desire to work the tooth, either with the fingers or an antagonizing tooth. There is also tenderness on pressure or percussion.

Second Stage.—Congestion, with some swelling. Symptoms, desire

to bite upon the tooth ; dull pain with slight sense of elongation ; some pain on pressing the gum over the root of the affected tooth with the finger.

Third Stage,—Acute inflammation of the periosteum, or fully developed periodontitis. Symptoms, acute pain, some decided throbbing, marked elongation, exquisite pain on occlusion, and transient relief by gradual and continued pressure on the tooth, but exacerbation on cessation of pressure.

The specific tests for periodontitis may be summed up as follows: Soreness ; desire to work the tooth, as above ; temporary relief from continued pressure ; heat ; swelling; and pain on a light sudden tap with a light instrument ; a sense of elongation ; a marked difference between healthy teeth and the affected one on gentle tapping. There is also peculiar redness of the gums, amounting almost to purple, at the free edge and between the teeth, as well as at a little distance from the edge. An evident difference is perceptible between this state of things and healthy gum, which is of a light red color, approaching pink at the free edge and between the teeth.

Treatment. The general treatment of acute or circumscribed periodontitis, as will be evident when we consider that it is but a variety of local inflammation, must be the standard antiphlogistic treatment, modified by such circumstances as the peculiar location produces. It may be advantageously arranged under the following general heads:

First,—removal of the irritating causes.

Second,—Absolute rest to the tooth.

Third,—Local treatment, application of astringent, sedative or stimulant remedies.

Fourth,—Regulations in regard to diet, exercise, &c.

Fifth,—Administration of constitutional remedies, such as aperients, &c.

The particulars under each head will be as follows: Removal of the irritating cause is the first indication. The practitioner will find much room for the exercise of skill and discrimination in diagnosing the cause. The list of possible ones heretofore enumerated must be borne in mind, and an effort made to ascribe the disease to the true one. In doing this the following considerations will serve as a guide:

The first cause is an exposed pulp. If the pulp is found exposed and no other cause is manifest, the trouble in all probability arises from that ; at least, no farther search need be made until that is remo-

ved. The destruction of the pulp by arsenic or otherwise is the remedy, and the peridental inflammation will subside spontaneously.

Should the trouble proceed from the second cause, caries, the remedy will be equally manifest, viz: the excavation and temporary filling of the cavity with cotton and sandarach or other material, in order to allow the soreness to subside.

The third cause, mechanical injuries, must be ascertained by inquiries directed to the patient, and if no other cause can be found, this may be the one.

The fourth cause, tartar, will be apparent on inspection, and the removal of the concretion, with the use of an astringent and sedative wash if necessary, will be the remedy.

The fifth, protrusion of filling material through the apicial foramen, can only be surmised from the history of the case; and as it is a very infrequent one, it must not be supposed to exist unless circumstances are strong enough to warrant it.

The sixth, loose roots, will also be evident on sight, and their removal will be the treatment.

The seventh, arsenical applications and local irritants, may be inferred from the history of the case

The eighth and ninth, imperfect or incorrect occlusion, and excess of filling material on the grinding surface, may be detected by a careful examination of the articulation and occlusion. The point of undue pressure may sometimes be discovered by placing a slip of hard wood or whalebone in different positions between the teeth as they come together. When the cusp or tooth which is unduly prominent strikes the wood, the patient will be instantly sensible of it. If an excessive amount of plugging material is the cause it may be detected by quickly and forcibly striking the teeth together; if they strike on a filling the sounds emitted will be dull and heavy, while enamel gives a sharp, clicking sound. Sometimes the point of interference may be discovered by inspection of the filling, a bright, polished spot being the result of unequal pressure.

The tenth cause, systemic poisoning, will be known by the history of the case, and the various local symptoms of those diseases. A cessation of exposure to the phosphoric or mercurial influences will of course be necessary. If the trouble is syphilitic it will fall into the hands of the general practitioner.

The eleventh cause, irritation from dental manipulation, may be in-

ferred from the history of the case, and if no other cause can be found, this may be surmised.

The last cause, putrescent pulp tissue, may also be detected by the history of the case, and by certain symptoms which we will proceed to describe:

If dental operations be improperly performed, if the pulp is irritated in excavating the cavity or introducing the filling, or more particularly by the use of arsenious acid or other vital irritants, for the purpose of obtunding the sensibility of the dentine, in cases where the pulp is exposed; or, as we believe in a majority of cases, if an attempt is made to insert a filling over an exposed and irritated pulp, either by capping or in any other way; or if the filling is separated from the pulp by only a thin septum of dentine, thus permitting the irritation of the pulp by conduction of heat or cold from food, drinks, &c.; or even sometimes in cases where the utmost care is made use of in all the stages of the operation, not to irritate the pulp; the consequence will be an irritation in greater or less degree of the dental pulp, and it is highly probable that it will produce sufficient inflammation to cause the death of this organ.

This result is accomplished in precisely the same manner as by arsenic; the only difference being in the length of time required to complete the work. When arsenic is used, a few hours usually suffices to carry the inflammation beyond the point of sensation; but under the above circumstances, the state of irritation and incipient inflammation may continue for weeks, and perhaps months.

The first symptom of this is occasional pain, followed by throbbing, which, under any of the above circumstances, is indication of a dying pulp. Paroxysms are indeed always an indication of a dying pulp. The pain in these cases is generally distinctly localized, but often includes shooting pains in various parts to which the facial nerve is distributed, as the temples, ears and face. Sometimes, however, the tooth itself does not seem to suffer, the patient will describe the pain as "neuralgia," and sometimes a sound tooth, or one which has a filling in it, or a spot of sensitive dentine will seem to be the real seat of the pain. In these cases extreme care must be used to locate the trouble correctly, for an incorrect diagnosis would result in the loss of a sound tooth, and fail to relieve the suffering. The cause may be looked for among any of the teeth on the same side, whether in the same jaw or not, as we have seen cases of seeming pain in a lower tooth, produced

by one in the upper jaw. This, however, is rather foreign to our subject, and we speak of it incidentally only, in tracing the cause of periodontitis from a putrescent pulp.

If the pulp is allowed to remain in the tooth after its death, soreness of the tooth will ensue in from three weeks to two months. This soreness will probably be but slight, and may last only a few hours. It is caused by an extension of the inflammation through the apicial foramen to the periosteum, producing slight symptoms of periodontitis; and is generally soon relieved by strangulation of the pulp at the foramen, followed by sloughing and a subsidence of the inflammation.

But should the dead pulp be allowed to remain in the tooth with no external opening, trouble from its decomposition may be expected in from two months to several years, averaging perhaps six months.

The decomposition of the dental pulp, like that of other organic matter, is dependent on a supply of warmth, moisture, and oxygen. Surrounded by a comparatively impermeable wall of dentine, the supply of the two latter of these, and consequently the decomposition of the pulp, must necessarily be slow, more or less so as circumstances modify the access and effect of the agents.

As is the case with other putrifying animal matter, the decomposition of a pulp is attended by the generation of mephitic gas. This gas, and the product of suppuration in connection with it, is the real cause of peridental inflammation from a putrescent pulp. Confined in a *retort* of unyielding structure, with only a single and that often minute mode of egress, it escapes under a pressure through the apicial foramen, giving rise by its irritating qualities to more or less irritation of the peridental membrane.

The peculiar *sign* by which a tooth containing a dead pulp is known is a dark bluish cast, resulting from the permeation of the dentinal tubules by the organic matter of the pulp. There is generally more or less *looseness* of the tooth. A difference (which in speaking of diagnosis by tapping, we omitted to mention) is appreciable to the practised operator in the *sound* emitted on tapping a diseased tooth, from that heard when a healthy one is struck; a difference which we never remember to have heard spoken of, and which it is hardly possible to describe. When a tooth, the connection of which with the alveolus remains healthy, is struck, the sound is as though everything was tense and firm, something as is the case when a nail nearly imbedded in a solid board is struck. But the contrary is the case when a dis-

cased tooth is struck; the sound and feeling to the operator are more like that given by a nail in the plaster of a wall, a sort of insecure feeling. A practised ear will often detect the affected tooth as it is struck, by this means alone.

Having ascertained the presence within the tooth of a dead pulp, the first indication in the removal of this cause is to open into the tooth, and remove the pulp. The best plan for doing this will depend upon the character and location of the tooth, the position of the filling and the nature of the material of which the latter is composed. If it is of foil it will usually be comparatively easy of removal. If of amalgam it will often be difficult to dislodge, and sometimes the operation will be productive of so much pain that it can not be accomplished. In these cases relief may generally be afforded by drilling a small hole into the pulp cavity at the most accessible point, either through the filling or under the margin of the gum. This, by giving vent to the pent up secretions, will allow the soreness to pass off, after which the operation may be completed at pleasure. If the filling is a good one, situated on the approximal surface of a front tooth, it will probably be advisable to drill through the palatine surface, and even if the filling has to be removed this plan will frequently be warrantable, as such a proceeding will not weaken the tooth as much as the removal of sufficient tissue from the neck of the tooth to afford an entrance, if the cavity is a small one, besides affording the operator a more perfect view of, and satisfactory entrance into, the canal. Lower molars may sometimes be entered on the buccal surface, and lower incisors and canines by drilling at the margin of the gum, on the buccal surface

By whatever means the cavity is reached, the opening should be as full and free as possible, and a view obtained of the openings into all the root canals; more harm resulting from a neglect of this than from a loss of substance in the tooth, provided the walls are strong enough to resist mastication. If possible, all the roots which a tooth of its class ought to have, should be entered, as near to the apex as possible. The incisors and cuspids will be easily cleansed; the bicuspids and molars will be more difficult; the bicuspids frequently have a bifurcated canal, and sometimes it is so flattened that an instrument is with difficulty passed up. The molars of the upper jaw, having three roots, are more difficult to enter — the palatine, and one of the buccal roots are usually easy of access, but the other buccal root is frequently too small to admit anything larger than a fine broach, and sometimes it

appears almost obliterated. The molars of the lower jaw, although possessing but two roots, will usually be found to contain three, or even four canals; the anterior root almost always containing two, which is sometimes converted into a flattened groove. The removal of the decomposing material should be as thorough as possible, for it is upon this that success depends. Sometimes the canals are too small to admit of an entrance. In these cases the best that circumstances will permit must be done, and it is happily the case that the amount of matter contained in a canal too small to be entered by a fine broach, will not under ordinary circumstances be sufficient, if impregnated with an antiseptic, to give rise to any unpleasant consequences.

Instruments for enlarging the pulp cavity and root canals, and removing the debris, are furnished by the dental depots. Those known as Arrington's chisels, Palmer's and Arrington's nerve instruments, and Gates' drills, will be found very useful in cutting and cleansing the tooth. If practicable a fine drill should be run nearly to the apex of the root, and the cavity thus cleansed and formed at the same time.

It will frequently, perhaps in the majority of cases — especially if the tooth has more than one root — be found impossible or inexpedient to accomplish the whole of this work at one sitting. Indeed, as has already been hinted, the pain is sometimes so great that the patient can not endure more than a mere entrance into the pulp cavity. The tooth should in these cases be left entirely open for a day or two after the opening is effected to allow the parts to recuperate from the inflammation, and the iritation arising from the operation; the patient being directed to insert a piece of cotton previous to eating, to prevent the cavity from becoming stopped with food, &c., or we may stop the cavity loosely with a lock of cotton dipped in some sedative mixture, as the following.

℞ Ether Sulph., Chloral., *aa*.....3i
Camph.,.....3ss
Tr. Opii,.....3i
Alcohol.....3ij
M.

This application being eminently soothing and palliative, is better in cases where there is much soreness than creosote, iodine, or anything stimulating. If there is but little soreness, the cleansing may be completed, the canals thoroughly saturated with creosote, and the roots stopped with cotton put in loosely, and extending into the external cavity, which last should be filled with a sandarach plug, so arranged that the patient can withdraw the whole together if rendered necessa-

ry by pain or swelling at the root of the tooth, with directions to report as soon as may be after such withdrawal.

Care should be taken during the manipulations not to force particles of the pulp, or of the tooth bone through the root canals, or even to stop the canals, either with the debris or by breaking off a broach, so that no egress can be permitted to any secretion that may take place at the end of the root; for such an accident might easily occasion the loss of the tooth. When we have cleansed one root, it is a good plan to fill it with cotton to exclude all the particles of bone, &c.

We come now to the second consideration — absolute rest to the tooth. This is best accomplished by placing a gutta percha guard between the teeth, to prevent the continuance of irritation by occlusion. This is formed by molding a piece of gutta percha previously softened in hot water, over a tooth not antagonizing with the affected one, and directing the patient to bite into it while soft. This, when hard, forms a guard which will last for two or three days. It should be worn during sleep to prevent involuntary occlusion at that time, and be kept on until the teeth can be occluded without pain.

The third indication — local applications — may now be attended to. Scarification of the gums is recommended as beneficial. Some eminent practitioners, indeed, adopt the heroic treatment at this stage, recommending a free incision with a heavy lancet, through not only the gum and external periosteum, but through the plates of the alveolus, and the alveolo-dental periosteum, down to and into the cementum, asserting that this operation is attended with but little pain, and affords almost instant relief.

Leeches may be applied to the gum if desirable. They should be applied on either side of the seat of inflammation, just at the confines of healthy tissue.

Applications of the saturated tincture of iodine, or iodine and creosote, may be used to advantage. Great care should be exercised in its use, as it is very strong and stains everything with which it comes in contact. The stain, however, passes off in a short time, or it may be removed at once with aqua ammonia. The iodine may be applied by painting with a camel's hair pencil three or four times a day.

Cool mouth-washes may be used with advantage. If the irritation is but slight, cold applications may be useful in promoting resolution. They must, however, be constantly employed for several hours, else the cold will have only a stimulant instead of a sedative effect, and

thus increase the trouble. The use of the ether spray has been highly recommended in cases of incipient periodontitis; those who have tried it asserting that one or two applications rarely fail to effect a cure.

Various medicated mouth washes may be used. The chlorate of potass. is one of the most valuable antiphlogistic remedies in the dental materia medica; a wash as follows:

℞ Potass. Chlor. ..... ℥ss.
Aqua, ... ℥ij.
M. et ft. sol.

may be used, diluted with water if too strong. In the use of it patients may be directed occasionally to swallow a little, as it acts as a mild diuretic, and thus as a constitutional antiphlogistic. Sodæ boras may also be used, if patients object to the chlor. of potass. The following is a convenient formula:

℞ Sodæ Biboras ..... ℥ss.
Aqua font., ... ℥iss
Glycerine, ... ℥ss.
M. et ft. sol.

The acetate of lead combined with chlor. of potass makes a powerful sedative solution. the following formula may be used:

℞ Plumbi Acetas. ..... ʒj
Potass. Chlor., ... ʒj
Aqua font. ..... ℥ij
M. et ft sol.,

or, the liq. plumb. subacet., combined with laudanum may be used, applied in the cavity of the tooth on cotton, and on the gum externally as follows:

℞ Liq. Plumb. subacet. ..... ʒj
Tr. Opii. ..... ʒij M.

(*McQuillen—Cosmos*, Nov. '68.)

Care should be taken to avoid swallowing any of these mixtures on account of the toxicological properties of the plumb. acet.

Alum mouth washes and gargles are astringent and sedative, but owing to the sulphuric acid contained in the alum, which acts upon the teeth, they are injurious to those organs, and should not be used where there are teeth in the mouth. If an astringent effect is desired, it may be secured by the use of tinct. of myrrh, kino, krameria, catechu, or tannin.

The fourth indication — regulations concerning diet, exercise, &c., — must be met on general antiphlogistic principles. The use of stimu-

lating food and drinks is not allowable, and no violent exercise should be taken; anything tending to promote inflammation should be avoided, and the head should be kept as high as possible during repose, in order to favor resolution.

The last general indication — the administration of aperients &c.,— is important, especially in severe cases. For slight difficulties, with delicate females, an efficaceous gentle aperient may be directed as follows:

℞ Magnes. Sulph.....℥j
Sol. in aqua.....℥ss

Add this to one bottle citrate of magnesia and take as agreeable.

It may be necessary to resort to the use of mercurials, especially in cases of obstinate recurrence after temporary relief. Calomel may be prescribed as follows:

℞ Hydrarg. Chlor. mit.....gr. xij
Opii.....gr. iij
Ft. pil. vi, S. 1 pill., every six hours,

or

℞ Hydrarg. Chlor. mit.....gr. xij
Ant. Tart.,.....gr. iv
Ft. pil. vi, S. 1 pill every 4 hours, ad nauseam.

The following has also been recommended in obstinate cases:

℞ Hydrarg. Protiod.....gr. iv
Opii.....gr. iv
Ft. pil. iv. S. 1 pill once a day.

If necessary an arterial sedative may be exhibited, as:

℞ Tinct. Acon. Rad.....gtt. viij
Aqua font.....f ℥ss
M. S. Two drops once a day.

If sleeplessness occurs, an opiate may be given, as Dover's Powders, gr. x. or Tinct. Opii gtt. v to xx, which may be increased in amount if the case increases in severity.

Perhaps this subject would be incomplete were we to omit to mention a preparation for periodontitis that has recently been brought before the profession by Dr. H. S. Chase, now of St. Louis. This is the third decimal trituration of mercurius vivus, a homeopathic preparation, and therefore not much valued by those opposed to that system of treatment. We have had no experience in its use, and can only say that a trial of it will do no harm, if it does no good.

We have now gone over the whole ground of the treatment of acute periodontitis with a view to its resolution, so far as it is known to us; and without alluding to that expedient, which is the never failing re-

source of charlatans, and which is sometimes in spite of all that science and skill can accomplish, the only resort of the scientific and well educated surgeon dentist — the extraction of the tooth — and it must be an obstinate case indeed, which will not yield to this treatment if skillfully applied.

But if periodontitis has proceeded too far for resolution, nothing remains but to hurry it on to suppuration, which will probably ensue in from three to six days. For this purpose stimulation is what is required. The tinct. of capsicum is probably the best local application. When used to promote suppuration the first application may be on a small piece of cotton upon the part. If strong, it will almost immediately relieve by counter irritation. The patient should be directed to hold it in the mouth at frequent intervals diluted so as to be bearable.

Roasted figs and raisins, while they promote suppuration, should never be used in the mouth, as the vinous acid contained in them is very corrosive, and highly injurious to the teeth.

Stimulant applications to produce pointing are not allowable on the outside of the face. No dentist should ever recommend them, on account of the unsightliness and difficulty of treatment of a fistulous opening on the outside of the face, which they would tend to produce, as well as the disfiguration of the face by the scar which would be left in healing.

The position of the head should be such as to favor a flow of blood to the part — and consequently suppuration. The recumbent posture should be preserved as much as possible.

In from three to six days, suppuration, ulceration and fistulous opening will ensue. The latter should be promoted by lancing freely from the inside of the mouth, as soon as signs of pointing indicate the location. Pus will then be discharged, giving immediate relief.

The disease has now advanced so far that it has become alveolar abscess, a subject the treatment of which we will not now enter upon.

In conclusion, we ask your pardon for detaining you so long, but it seemed impossible to go over the whole ground in a much less space. We submit this essay, aware of its many defects, but hoping that in the subsequent discussion of the subject, some good results may be reached.

The subject being open for discussion,

Dr. Mowbray:—Thought the death of the pulp did not necessarily produce periodontitis, as if this occurred by the use of oxy-

chloride of zinc, the pulp seems in some cases to vanish or disappear, without giving rise to unpleasant symptoms.

Dr. Crouse:—Has used mercurius vivus without effect, but has seen charming results from the ether spray; uses tincture of iodine and creosote with success, applied up under the gum as far as possible; has lanced many times without benefit; has used ice with success, but it takes too long: has also used Epsom Salts.

Dr. Chase:—Said that there was very little remaining to be said, as the paper just read had exhausted the subject. With regard to mercurius vivus, he thought its use was not sufficiently persevered in. Mentioned as an additional cause of periodontitis to those specified in the paper, the protrusion of filling material at the margin of the gums. Spoke of a variety which he thought might be termed gingival peridontitis, and he cured it by iodine and creosote. In acute periostitis would recommend soaking the feet in hot water. Formerly used cathartics, which were successful in simple cases, but now relies on mercurius vivus. No one remedy will reach all cases. Recommends also antimonium crudum, and other remedies used by homœopathic practitioners. Has found remarkable results from ether spray. Related a case of relief in a few seconds, though swelling had occurred. But for standard treatment relies on mercury in minute doses. Has had but little success from topical bleeding.

Dr. Eames:—Being called for, gave a brief history of the origin of the *Missouri Dental Journal*, published under the auspices of the Missouri Dental College Association. The want of a journal devoted to the advancement of dental science here in the West, had long been felt and recognized by the profession. To meet this want the *Missouri Dental Journal* was established. The more fully to meet the requirements of the profession, it embraced the three departments, scientific, operative and mechanical, each under the control of a special editor. It had now been before the profession since January last, and he was happy to be able to say that it had thus far met with a very hearty and cordial reception, certainly very flattering to those immediately connected with this enterprise.

THIRD DAY—MORNING SESSION.

The Association was called to order at 10 o'clock, the president in the chair.

Minutes partially read and the further reading dispensed with.

The subject of periodontitis was passed, and the next subject, Alveolar Abscess, taken up, being opened by a paper on the subject by Prof. Judd, of St. Louis, which was read by Dr. Eames.

ALVEOLAR ABSCESS—ITS HISTORY, PATHOLOGY AND TREATMENT.

By H. Judd, M.D., D.D.S.

No subject in the whole history of dentistry has attracted more of the attention of the profession than that which relates to alveolar abscess. Although its history may be perfectly familiar to every one present, still lest there may be some that have not especially studied this disease as carefully as they should have done, I will spend a few minutes in giving a cursory description of it. A hyperæsthesia rather than actual pain, may be the first manifestation of a change from the normal condition. Application of heat or cold may give rise to pain, or even slight pressure upon a tooth, which before was not susceptible to so slight a cause. The tooth, or perhaps several teeth, finally become sore and appear to project from their sockets, so that they strike the antagonizing teeth before the occlusion of the jaws is complete. The pain at this stage is not usually severe, and may be more an uneasiness than a real pain. Steady pressure at this stage of the disease seems to relieve the uneasiness for a time, but upon the removal of the pressure the uneasiness returns, becomes more marked, and perhaps passes into a pain of considerable violence, which after a short time partially subsides: but time finally develops a dull aching pain, which is sometimes throbbing in its character. There can be no mistaking it for a neuralgia, as in the latter the pain is sharp and lancinating, contrasting strongly with the dull, heavy, aching pain that marks the early stage of alveolar abscess. At this point more or less febrile symptoms not unfrequently make their appearance; an acceleration of the pulse; dryness of the skin; sometimes pain in the back and extremities; dryness of the tongue; thirst; loss of appetite; bad taste in the mouth, &c.; the pain increases sometimes until it becomes exceedingly violent and almost unbearable. Swelling of the soft parts in the vicinity of the forming abscess takes place, sometimes extend-

ing over one entire side of the face. The gums and mucous membrane present a red or purple hue, and a sensation of heat with a veritable increase in the temperature of the parts completes the common symptoms of inflammatory action. A considerable amelioration of the pain and other inflammatory symptoms not unfrequently occurs upon the supervention of suppuration, which in large abscesses is sometimes ushered in by a distinct chill. The abscess points as a general thing upon the gum, not exactly over the apex of the tooth which is affected, but at a point somewhat nearer the margin of the gum, and sometimes more than half way toward the neck of the tooth from the apex. But in certain cases it points in such direction as to make an opening upon the outside of the face, instead of a opening within the oral cavity. Sometimes it finds its way down by the side of the fang of the tooth between the periosteum and cementum, and escapes at the cervix from beneath the margin of the gum, and sometimes when the abscess is at the apex of the roots of the superior molars or bicuspids it finds an opening into the antrum, and the pus finds its way through the antro-nasal opening into the middle meatus of the nose. Sometimes the pus burrows beneath the skin and muscles, and makes its way far down upon the neck or even below the clavicle before it finds an exit. After the opening has been effected and the pus discharged, the pain and swelling generally subside, and in some cases, though rarely, the abscess seems entirely to disappear. In a majority of cases, however, after the abscess has once opened it soon closes, but as soon as an accumulation of pus has again taken place it opens and discharges the pus again, and usually this time and subsequently with little or no pain or disturbance, and this process may go on for months or even years. At other times a constant discharge of purulent matter keeps the opening from closing, and we have a fistulous abscess.

In some of these cases the abscess is formed, the pus makes its way through the tissues and finds an outlet with very little pain, and in rare cases with no pain at all. In some cases there is little or no swelling, and in other cases the swelling is enormous, but the pain and constitutional disturbance is not proportioned to the swelling, as in some cases where there is extensive swelling of the parts there is but little pain or febrile action, or vice versa.

The pathological condition corresponds for the most part with the usual conditions present in inflammation, modified to a certain extent by peculiarities of position, so that if we attempt to describe the pa-

thology of alveolar abscess we are at once launched upon the boundless sea of speculation and discussion which has for ages occupied the attention of the medical world, but which, up to the present time, has thrown but little light upon the essential characteristics of this most common and most formidable of all diseased conditions, inflammatory action.

We do not feel warranted in the course of our short résumé of this subject to enter into these speculations, or even to give a recapitulation of the various doctrines which have from time to time appeared, but which for the most part have failed to furnish a satisfactory explanation of the phenomena observed, but it may be well to devote a short time to an examination of a few recent observations bearing more particularly upon the philosophy of one of the results of inflammatory action, viz.: that of suppuration.

Microscopic examination of pus reveals nucleated cellular bodies in a somewhat viscid fluid. The nuclei are not always visible, but become so through the action of acetic acid or other reagents when the pus corpuscles or cells are seen to be polynucleated. It was observed that these corpuscular elements resembled the white corpuscles of the blood and the lymph corpuscles, whilst more or less of similar bodies were found in mucus and likewise in healthy areolar tissue. These have all been observed by different investigators, and have been described under different names, and have figured extensively in various theoretical disquisitions. Much time and labor has been expended in attempting to determine the differences between pus and mucous corpuscles, but without success, though a fact of much greater importance was established by the inquiries, and that was the fact that the mucus and pus corpuscles were identical, and subsequent observations have clearly identified these with the white blood corpuscles, the lymph corpuscle, the wandering cellular elements found in areolar connective tissue, and the exudation corpuscles of the older pathologists; and this sweeping generalization in its relation to inflammation forms the most salient point that has been developed for many years in the history of pathological investigations.

An inflammation thus resulting in the formation of pus, usually at the apex of the fang of a diseased tooth, is the pathological condition found in alveolar abscess. But we will pass on after these few hints upon the pathology of this disease, to a consideration of its treatment. This as a matter of course must not only be adapted to the stage of

the inflammation, but also to the varied diatheses, temperaments and conditions of the patients, so that it will be impossible to give definite rules for the treatment of this or any other disease. In the early stage of the inflammation, however, when there is an uneasy sensation rather than actual pain, and before there is much swelling of the soft parts, we are able to bring about a perfect resolution by the application of cold. By throwing the spray of rhigoline or anhydrous ether upon the tooth and surrounding parts, the engorgement of the vessels is to a great extent relieved, and the inflammation is entirely subdued. I do not propose to enter into a discussion of the various questions relating to the philosophy of its action, but experience has taught its efficacy, and if used in the first stage of the disease it relieves the inflammation more promptly than any other means that I am acquainted with. Some care should be used in its application, and I would particularly call the attention of practitioners who are not familiar with its use to a few points that may be of service to them if they should ever make use of it.

I would remark *en passant*, that I believe ether is better than rhigoline for this purpose, but as pure anhydrous ether is very difficult to procure, and rhigoline is easily and cheaply obtained, it is probable that the latter will generally be used, unless it be in the large cities where pure anhydrous ether can more readily be found. In the use of rhigoline care must be taken not to apply the spray to the gum too long, as the gum may be frozen so that it will slough off if it is not used judiciously, but the spray should, for the most part, be directed upon the tooth itself, with only an occasional jet upon the soft parts. In many cases the pain will cease entirely in a half minute after the spray is thrown upon it, but it is well to keep the parts well chilled for two or three minutes, and if the pain returns in ten or fifteen minutes after the spraying is stopt, it should be repeated again, and, carefully and effectually done, in a good many cases the pain will not return at all and the incipient abscess is cured; but it must ever be borne in mind that this result will not be attained, as a general thing, if suppuration has already commenced, though I have seen cases treated by spraying after suppuration had set in, when the pain suddenly ceased and the pus made its way through the alveolar process and soft parts and established a fistulous opening without the least pain having been experienced after the spray was used; but this is not usually the case, and after pus is once formed, spraying the parts

seldom does much good. I wish to remark, that when the inflammation has passed on until necrosis or even caries supervenes, the application of the cold does positive injury, and the pain accompanying necrosis is much aggravated.

In some cases, after the spray has been used only moderately, the patient complains of a severe smarting pain in the gums and other tissues adjoining the location where it has been applied, — this can almost always be immediately relieved by filling the mouth with cold water and retaining it in the mouth for a few minutes. Leeches have been applied sometimes with great advantage in this stage, whilst free scarifications of the gums have been recommended, but though sometimes useful, they are not as generally efficacious as the use of the spray. If the pain is severe and persistent in this stage, and if there be febrile action with thirst, dry skin, pain in back, &c., it will many times be proper to give a cathartic, soak the feet in hot water, and if these measures fail to procure rest, give ¼ gr. doses of acetate or sulphate of morphia, repeated every hour or even oftener if the suffering be great, until the patient is relieved, remembering that when there is severe pain the system will tolerate much more opium or morphine than at other times, without danger. Hot poultices are sometimes useful, in the early stage of the disease, but after suppuration has set in care should be manifested in their use, lest the poultice should induce the abscess to point through the cheek, upon the outside of the face, instead of opening within the cavity of the mouth; but if the abscess be pointing through the gums, the application of a poultice will hasten the process, and sometimes, to a considerable extent, alleviate the pain

After the second stage has fairly set in, when pus is already formed, the quicker it has an outlet the better, and much suffering may be prevented by making a free opening to it with a lancet; but the cases with which we shall have most to do, are those that have already assumed a chronic character — fistulous abscesses, or those that open and discharge their contents at longer or shorter intervals. In these cases, if we examine the anatomical and microscopical characteristics of the parts about the apex of the fang, we find for the most part a sack inclosing a small portion of the apex. The walls of the sack are continuous with the peridentium, and the apex of the root is, as a general thing, more or less absorbed; that is, the cementum is absorbed, but the dentine is not removed, but projects into the sack and

beyond the margin of the cementum; the sack lies mostly in a cavity hollowed out of the alveolar process of the bone and is sometimes the size of a small pea and sometimes much larger. The microscopic characters of the sack simulate the white fibrous connective tissues, and I have seen the wavy fibrous appearance in old sacks clearly delineated, whilst those of more recent formations present a more homogeneous appearance under the microscope, with a texture much less firm. The sack is exceedingly vascular, and it is probably from the vessels of the sack that the corpuscular elements that make their appearance in the fluid discharged from the fistulous openings escape as pus corpuscle, preserving all of the morphological characteristics of the white blood corpuscle, but wanting in the reparative potentialities of the latter, and consequently in a state of incipient degeneration. These inflammations, which give rise to abscesses, are engendered in different ways and lighted up by different agencies, but by far the most common cause of this variety, *i. e.* abscess at the apex of a fang of a tooth, is found in diseased conditions of the pulp.

Keeping these facts in view, the rationale of the treatment will, to a considerable extent, be evident The sack at the apex of the root is the active agent in the production of the pus, and the decomposing debris of the pulp furnishes a constant source of irritation that, were the sack entirely destroyed, would soon suffice to renew it, so that the *fons et origo* of the whole mischief resides in the pulp cavity in a great majority of cases, and in many cases, if this constant source of irritation is removed the sack will gradually become absorbed and its place be filled by healthy tissues, but in old cases, where the "habit" has been long established, the suppuration will go on often after the primary exciting cause has been removed. To remove all foreign substances from the pulp cavity, then, is the first indication of treatment, and to prevent a reaccumulation of *perishable* substances there; and next to destroy the sack at the apex of the fang, the immediate cause of the suppurative process.

The first indication is in some cases somewhat difficult to fulfil, but by the use of proper instruments and sufficient care and perseverance the cavity may be pretty thoroughly cleaned and securely filled with gold; but lest our explorations should not reach the apex of the root, it is generally best to keep the pulp cavity well filled with creosote or carbolic acid for a few days before permanently filling it with gold, in order that the small atoms of the debris which may have escaped us

whilst cleaning the cavity may be so thoroughly saturated with these antiseptics that decomposition in them will be nearly or quite arrested. I say nearly, because it is not probable that soft substances can be so prepared as to entirely resist the tendency to disintegration, but if only small quantities of these irritating gases are released they may be absorbed and carried off by the healthy tissues without producing serious disturbances. This can be done very effectually, by carrying up a broach wound with fine cotton which is saturated with creosote or carbolic acid, if possible, to the very apex and then withdraw the broach, leaving the cotton in the cavity for twenty-four or forty-eight hours, and then withdraw it and replace it with fresh cotton saturated in like manner, and repeat this every day or once in two days until no fetor except of the creosote can be discovered upon the cotton when it is withdrawn from the cavity; when, if the tooth is otherwise in proper condition, it may be filled.

It is utterly impossible, however, in a paper like this to enter into these minute details, as it would lengthen this essay into the proportions of a volume; we must, however, devote a little time to the consideration of the second indication to be fulfilled in the treatment, viz: The destruction of the sack at the apex of the root. If creosote or tincture of iodine or carbolic acid can be forced through the nerve canal of the tooth and into the sack through the foramen at the apex, the destruction of the sack is usually easily accomplished. This may be done by carrying up either of these agents on a broach wound with cotton, and forcing the fluid through the foramen at the apex and likewise through the fistulous canal until it makes its appearance at the outlet upon the gum, or the medicine may be forced through the canal into the sack, and through the fistulous opening by means of a syringe with a small nozzle. The nozzle being first forced through a small piece of rubber a line in diameter, and then the nozzle being placed in the canal, the rubber may be pressed up so as to close effectually the opening into the nerve canal and prevent the fluid from regurgitating into the mouth. If the medicine can be forced through the abscess so as to show itself at the margin of the fistulous opening, the destruction of the sack, as before observed, almost always follows and success is generally attained, but in certain cases the opening is exceedingly small or the canal is tortuous or nearly closed by deposits of calcified substance, and it is clearly impossible to fill properly to the apex of the root.

But a difficulty of an opposite character presents itself not unfrequently; usually in old fistulous abscesses in which the opening through the whole fang is so large that great care is required lest the material used for filling the canal should pass beyond the apex. into the alveolus itself. This condition is brought about by the absorption of the cementum, which forms the whole of the tissue of the fang at the apex, as the canal is much larger through the dentine than it is at the point where it passes through the cementum near the apex. Much care is necessary in these cases in order to carry up the filling to the apex of the fang and not carry it beyond it, but by measuring carefully the exact distance to the apex of the root and then by passing up cotton pretty firmly wound around a broach and withdrawing it. the size of the canal can be pretty well determined, and then a section of a cone formed by rolling up gold foil as near the size as can be determined. may be carried up to the apex of the fang; the length of the canal having been previously measured, there will be but little danger of carrying the gold up too far, and in this way the canal can generally be filled with sufficient accuracy to ensure a favorable result. But I have already trespassed too far upon the patience of the society, in attempting to pass over ground so extended, although I have attempted only to give a brief summary of a few of the most important points that should be considered in a thesis upon the History, Pathology and Treatment of Alveolar Abscess.

The subject being open for discussion,

Dr. Mowbray:—Said that he thought the condition of the blood seriously affected the result. If the system is anæmic we cannot look for success with any degree of hopefulness. Dr. Judd's treatment is wholly local, while the cause is not wholly local. Thinks alveolar abscess may be produced by overlapping of the filling on the periosteum, by wedging, and by cold. Alluded to a case produced by the patient taking cold by lying on the floor. Formerly, before he had read medical works, he had wondered why some members of our profession paid so much attention to the blood and general condition of the system, but does not since he became acquainted with medical matters. Thinks we need more medical knowledge to successfully treat this disease.

Dr. Kitchen:—Related a case which resulted in the loss of all the teeth in the jaw, and a great portion of the maxillary bone. The physicians differed in their diagnosis, some thinking the disease proceeded from the antrum.

Dr. C. S. Smith:—Related a case which resisted all attempts to cure it, and was given up; but being abandoned to its fate, recovered spontaneously after a few months, the roots, one of which was freely open at the apex, being filled with orange wood dipped in creosote, driven up with a mallet, and the external cavity filled with amalgam.

Dr. Rivers:—Related a case which was treated for eight months with no success, but some time after the patient presented herself with the tooth cured spontaneously.

Dr. Cushing:—Thought the cases cited suggested the idea of over treatment, and if the treatment had been stopped at an earlier period the result would have been the same.

Dr. Black:—Thought skillful letting alone the best treatment after the removal of the cause, in many cases. Thought the use of arsenic in proximal cavities required care, and cited instances of injury from its use. Suggested the use of gutta-percha between the teeth to avoid the contact of the arsenic with the gum. Thought the forcing of gold through the root might be prevented by running a drill up the canal so as to form a shoulder to force the gold against.

Dr. Chase:—Regarded alveolar abscess as a continuation of periostitis, and termed it suppurative periostitis. Sometimes pus was formed without true abscess. Pus and mucus and white corpuscles are identical. The first time pus is formed there is no sac, and it is only from a continuation of periostitis, that a sac is formed. Often there is no sac, or if so, it may be on one side of the root. In these cases it is difficult to bring agents into contact with the diseased tissue. Thinks in cases where there is difficulty in forcing the agents through the fistula, there is a more favorable prospect for success. His treatment is much the same as has been detailed, but uses mercury and also hot foot-baths. Uses creosote or iodine, saturating the root with it, and also forcing it through the canal with a little red rubber, softened and

forced up by a blunt plugger. Sometimes a half hour must be consumed in the operation. Sometimes we fail to get creosote through the root, and very likely in these cases the cavity is so large that it cannot be filled with a small quantity of creosote. In such cases he is usually successful. Spoke of a case of central incisors which, though sound, suppurated within a short time after the patient's marriage, which he ascribed to cerebral excitement arising from sexual intercourse. These cases were easily cured.

Dr. Mowbray:—Thought abscess might be produced by excessive wedging. Thinks some patients are very sensitive as regards the life of the pulp. Thought the causes of abscess numerous. Uses mercurius vivus and found it efficacious in the case of children cutting teeth in every instance tried.

Dr. Chase:—Speaks of over medication, and does not apply remedies oftener than once a week, and not then unless suppuration ensued.

Dr. O. Wilson:—Bore testimony to the efficacy of mercurius vivus.

Dr. Mowbray:—Inquired if any one had used it on children's teeth.

Dr. Henry:—Said he had with his own children.

Dr. Black:—Thought the parts needed stimulation in order to induce granulations, and used injections of sulphuric ether for this purpose with much success.

The special Committee on Publication, reported that the publishers of the *Missouri Dental Journal* have offered to publish the reports of this Society merely charging what it costs them.

The Committee to whom was given the discretionary power in the matter, report their acceptance of the proposition, and ask to be discharged.

O. WILSON, *Chairman.*

Dr. Wilson:—Supposed that the reports would embrace the papers and discussions, and thought the expense would not be heavy.

Dr. Rivers:—Suggested printing a sufficient number of copies

to distribute to each of the dental journals and members of the Society.

Dr. Cushing:—Stated the cost could not be exactly estimated, but supposed it would be from $50 to $65, according to the number printed.

Report adopted and Committee discharged.

Dr. French:—Moved that the Secretary be instructed to make a full report, and the publishers of the *Missouri Dental Journal* be authorized to draw upon the Treasury for the amount required. Carried.

The next subject, The File, its Use and Abuse, was passed, and that of Anæsthetics in Dentistry, taken up.

Dr. O. Wilson read the following paper upon the subject:

ANÆSTHETICS IN DENTISTRY.

Whatever of interest attaches itself to other subjects connected with our practice, Anæsthetics in Dentistry the subject chosen by the honorable committee for discussion at this time, ever has intense claims upon our attention; because immunity from great pain is expected at our hands, and secondly, because vitality is so intimately connected with their exhibition

Anæsthesia, from the Greek, means a loss of the sense of touch, but as commonly used, insensibility. An anæsthetic therefore is anything that will produce it, or suspend nerve function.

Alcohol is an anæsthetic, so also is carburetted hydrogen, aldehyde, amylene, and the whole family of ethers, nitric, acetic, &c.

Anæsthetics are termed local or general, as they affect a part of or the whole body.

Like our profession itself, anæsthesia antedates its own record, so remote is its origin. Fifteen hundred years of Chinese history, and eighteen hundred years of its christian progress fail to tell its story. All along down the ages, the afflicted of every land have yearned for painless surgery.

Cautery, (active or potential), henbane, cannabis Indica, mandragora, hemlock, biology, electrobiology, animal magnetism, psychology, hypnotism, and electricity, all figure in the history of anæsthesia.

In the eighteenth century a recipe for sulphuric ether was probably given by Albertus Magnus. In 1772 D. Priestly discovered nitrous oxide. In 1831 chloroform was brought to light in this country,

France and Germany almost simultaneously. But it was reserved for a Yankee dentist in the land of wooden nutmegs, about the middle of the 19th century, to *demonstrate* the *success* of anæsthesia by the inhalation of gas or vapor.

While, therefore, we remember with gratitude the originator, may we not, as a profession, with just pride congratulate ourselves, if not for the *discovery*, certainly in the universal *application* of this so great boon to humanity.

Local anæsthesia, by congelation, is of recent origin. Drs. Branch of this State, and Arnott of London, applied a mixture of ice and salt to the part to be operated upon. This method has generally given way to the narcotic spray production and application of Dr. Richardson, of England, the best known method of producing local anæsthesia, reflecting much credit upon its originator.

This for local anæsthesia, and ether, chloroform and nitrous oxide for general anæsthesia, are the anæsthetics now commonly resorted to in dental as well as medical practice.

General anæsthetics cut off brain force from the part to be operated upon, while a part to which a local anæsthetic is applied, is itself cut off from brain function, for a space of time nearly in the ratio of their exhibition.

For instance, if the protoxide of nitrogen be used, the anæsthesia commences and endures very much in proportion to the time occupied and the quantity used in its exhalation.

If narcotic spray be used, insensibility is in proportion to the volatility of the liquid used and the depth of congelation; and whether the anæsthesia be general or local, however the means used differ, the anæsthetic condition is nearly the same; and we may add that anæsthetics generally act the same in or out of the animal organization.

Plainly, less responsibility is involved in the use of local than general anæsthetics, and there are few in either of the healing professions who, we think, would not hail with delight a resource freeing them from the anxiety inseparable from a use of the latter.

Three things are demanded at our hands by the majority of patients about to undergo a surgical operation: freedom from pain, unconsciousness of the act, and safety.

These guaranteed, with the knowledge of it universally disseminated, although some good ones might be sacrificed, the crumbling use-

less teeth, with their attendant evils, would be ousted, just in proportion to the patient's faith in what we should all teach: That to attain and maintain a healthy mouth is a duty alike due ourselves and society.

Local anæsthesia would seem to fulfill the first and third conditions demanded, but in our own hands has not shown itself as universally applicable as desirable. Its reception by the public, and especially by our profession, was enthusiastic enough, it seems to us, to flatter the most stoical of philanthropic inventors.

Its application, by propelling ether, rhigoline, etc., through a vessel with small outlet apertures, by means of a rubber bulb worked by the hand with such force as to apply its spray to the part to be operated upon, is pretty generally known. It involves but one risk, that of sloughing, which indeed may be by skill and care avoided.

Insensibility of soft tissue is indicated by the blanched appearance. If ether alone be used, it will take about 35 seconds. A mixture of ether and chloroform takes more time. One advantage in the use of spray is that the soft tissue is not, when blanched, so hard as when ice and salt are used.

Rhigoline is the best hydro-carburetted fluid yet produced for use in extracting. It is more rapid in its action than ether, producing congelation in about 15 seconds under favorable circumstances. It is well to wipe dry the part to be blanched, to avoid the film of ice.

In congelation rapidity is safety. To freeze is to extract heat. Now if this heat be removed rapidly enough, there is, even in warm blooded animals, neither preaction nor reaction perceptible; and if men were frogs, (cold blooded,) they could be frozen bodily, and kept so indefinitely without injury, recovering just as soon as the natural amount of heat is restored.

With care and skill we can conceive of no limit to the safety of using this anæsthetic, short of wholly stopping the circulation, or applying it to the medulla oblongata, the seat of respiratory power, in which case death would be immediate.

As an obtunder, narcotic spray has hardly a known equal. As a remedy in incipient periostitis, the same may be said of it. It is necessary, we think, to apply it about 30 seconds.

It is not necessary to blanch, but it is better to apply more directly upon the tooth affected. A mixture of 6 parts of ether and 2 parts of chloroform is very useful for such cases.

Notwithstanding the very many advantages derived from the intro-

duction of this anæsthetic, it is unsuited in its application to deep seated roots far back in warm, wet mouths; so much so, as to make it impracticable to rely upon in extraction in general; even with that fewer class of patients who express themselves desirous of *realizing* all the steps of an operation.

But anæsthesia in the abstract, to-wit, paralyzation of the sense of touch alone, does not satisfy the demand upon us, even were it universally applicable; and nothing will, short of general anæsthesia—paralyzation of the sensibility, will and intellect—and this with comparative safety, for this word can hardly be used in any other sense.

Vieing with each other for the supremacy then, are the trio of anæsthetics, ether, chloroform and nitrous oxide. If we include its war history, chloroform has been much the most used, and has the greatest number of deaths recorded against it. At the present writing ether is probably more used than chloroform. It has not so dark a record.

The Boston *Journal of Chemistry* estimates the number of administrations of nitrous oxide at half a million. Notwithstanding the logic of chemistry and experience, these anæsthetics have separate friends, tenacious of their opinion that their favorite alone is fit to use. But if we except the Richardson school of believers in England, and some others there and in our own country, we think the judgment of both continents largely in favor of nitrous oxide.

This seeming difference of opinion seems to us much like that of three sailors disputing about the colors of the chameleon, (changing colors according to its surroundings), since the effect of general anæsthesia is so much modified by the circumstances of purity of material, position of body during an operation, and condition of the body itself.

Purity of material is an indispensable condition of success. As to position of body, the reclining is the best for all anæsthetics that primarily produce local paralysis.

One strong evidence of this is the success of resuscitation by inversing the erect position, thus throwing a large volume of blood upon the brain.

Like most of the family of ethers, sulphuric is obtained by the distillation of alcohol with an acid; but since there is no acid residuum, the name sulphuric is by some considered a misnomer. There is, however, acetic acid in ether kept too long. It is lighter than alcohol and its vapor inflammable, but the latter, being heavier than air, enables us to use it in artificial light safely, by keeping the light above it.

It is tardy in its action, does not produce local paralysis, and is not therefore, on this account objectionable in extracting.

Much of this apparently tardy action is due to the prodigal use made of the vapor in the ordinary method of administering it, the majority escaping into the room without being appropriated, because of its extreme volatility. The volatility of all fluids, or the degree at which they give off their vapor, is nearly in the order indicated by their boiling point.

This anæsthetic boils at 90 degrees, and therefore can be tolerably well tested for purity by holding in the hand, when boiling can be distinctly heard.

The stimulating effect of all anæsthetics, is produced by contracting the arteries, and throwing a large volume of blood upon the nervous system. When this effect is maintained for some time, it is said to be permanent, and when it is of short duration it is called diffusible. As a diffusible stimulant, ether acts promptly. It is largely composed of carbon; acetic acid is the ultimate result.

In chloroform, carbon is also found, in the proportion, however, of 12 parts to 1 of hydrogen, the balance, 105 parts, is chlorine. Chloroform is not therefore an acid or an alkali; but applied locally it first acts as a diffusible stimulant, then as an escharotic; just so does it act generally, consequently it has a tendency to abolish sympathetic function and palsy the heart.

The impurities of this article are such as result from decomposition or those which reduce its strength, such as alcohol. They and the tests for chloroform are pointed out by Sansom in his work on it. Perhaps there is no other anæsthetic in the use of which the supine position is more important than chloroform, because it produces local paralysis.

Ninety per cent. of all the deaths from it occur during the beginning of its exhibition, and what seems more strange is that these subjects are from the healthy class instead of the cachectic.

How far our profession is culpable it is well to inquire, because of the fact that a large proportion of these deaths are directly traceable to one of four causes, to wit: the position of the body, impurity of the chloroform, mental shock, or asphyxia; which also encourages us to hope that this margin may be greatly narrowed down, for we believe that all of these four prolific causes of death can be removed.

Asphyxia is caused by too great exclusion of atmospheric air, differ-

ing from syncope, since this is occasioned by an *over dose*, the chloroform acting subsequently to removal of it from the patient, having accumulated in different parts of the body, (for which it has a greater affinity), transforming the blood, and producing formic acid ultimately. A remedy, therefore, for asphyxia is to dilute the vapor by the use of mechanical means, giving a very low per centage of it at first. At a temperature of 60° the atmosphere will take up of this vapor about 12 per cent.

According to the best authorities 6 per cent. is the utmost limit of safety, (this even is fatal to brutes). Ellis thinks 4½ per cent., beginning with 1 per cent.

Mental shock occasioned by fear, concussion or an effort of the will, by muscular persons, not to succumb, is a subject for unlimited skill to calm. The remedy for position and impurity is apparent.

One strong inference that this anæsthetic has an affinity for and dissolves the hæmatin, upon which the color of the blood is supposed to depend, is that the anæsthesia commonly commences about the time it has made the circuit of the body. If, however, by diluting and regulating the quantity of vapor inhaled in a given time, this action can be kept so low as to prevent the production of formic acid, and we avoid all the known causes of asphyxia, not forgetting to give it when the stomach is empty, we may then, we think, look to aneurism of the heart, (or some of the four first in size arteries leading from it) as the greatest of all counter-indications. This is imperative.

The best time to operate, we think, is just after muscular tremor or between the suspension of voluntary and involuntary motion. Some of signs of danger are syncope, pallor, prostration of the arteries, and the heart's action; this last survives all others.

Failure of the circulation is a primary sign of danger, and a pulse below 40 alarming; in which case no time should be lost and no perseverance spared in resuscitation as above referred to, Hall's method, etc. If the battery be called into use, an excellent plan is to place the poles at the medulla oblongata and sternum. These details are fully laid down by authors.

Chloroform is also a diffusible stimulant, but of exceedingly short duration.

Ordinary stertor or snoring, turgid vessels, and a red face, indicate a regular pulse, but that stertor which more resembles the bray of a certain hybrid, is ominous of formic acid.

Mixtures of ether, alcohol, etc., with chloroform, seems to us wrong in theory, and productive of little good. A mixture of one-half alcohol is the best with which we are acquainted, inasmuch as only about one-half as much chloroform can be evaporated in a given time, the discrepancy is on the side of safety.

By heating the nitrate of ammonia to 480°, each particle becomes four parts water; the balance, 2 parts, is nitrous oxide, itself composed of oxygen 1 part, and nitrogen 2 parts, but in equivalent proportions, and chemical combination.

Nitrous oxide is a permanent stimulant, almost without reaction from the first anæsthetic effect, and it is a noticeable feature that it varies from air more in degree than in physiological effect.

Here then is an anæsthetic most conservative, compatible to a very great extent with physiological law; and in general the nearer we nestle to the laws of God concerning us the better.

To ascertain the purity of the nitrate of ammonia, heat it on a platina plate,—if there be no residuum it is probably pure. The most convenient test we know for the purity of nitrous oxide is to inhale it; if there be nothing disagreeable about it, inducing no shock of the glottis, and no smarting of the mucous membrane, there is not much deleterious about it. It is our experience that pure water alone will wash it clean, provided the boiling be slow enough; it is, however, well to have the copperas crystals in one, and the caustic potash in another jar, to take up any deutoxide of nitrogen that might result from overheating. To preserve retorts, an excellent plan is to enclose them in a bright tin cone.

By passing both the inhaling tube and that from the jars in at the base of the gasometer, thence to the top of the water, all kinking of the flexible tube is avoided, and the gas may, with care and skill, be making and administered into and from the same meter at the same time.

If we except the *appearance* of patients during the inhalation of nitrous oxide, there is perhaps no one thing more noticeable than the apparent variableness in the *quantity* of the gas inhaled by different persons. This to a very great extent, we think, is due to the inaccurate working of valves. If it be a suction or gravity valve, its accuracy of work depends upon the force applied, whereas at the least possible breath the valves should open a full half inch, and close exactly tight with the same slightest power applied. If they admit

air, just in that proportion will there be variableness in the length of time it takes to produce anæsthesia, and an unnecessary anxiety on the part of the operator.

In the administration of this anæsthetic, unlike that of ether or chloroform, there should be no admixture of it, but an *occasional* inhalation of it alone is a great relief, especially with the excitable or plethoric. As is well known, the less air there is in the lungs at the beginning of the administration the better, but an inhaler should be so constructed that it will be unnecessary to *tell* the patient to "empty the lungs," as this often adds to the commonly too great anxiety and confusion of the patient. Fright is a serious obstacle to the happy success of any anæsthetic, especially is it so with this.

The question is very properly mooted as to how nitrous oxide produces anæsthesia, and the propriety of adding more oxygen, on the principle, we suppose, that its happy effect is due to the oxygen it contains, and if one-third is good, more must be better.

Oxygen alone will not support animal life for any length of time, by reason of excessive combustion, though fowls will live in it about five times as long as in common air confined. As found in the atmosphere (4 parts to 1 by weight) there is no known substance that will absorb nitrogen, though here there is no chemical combination—they act together when air is inhaled. That they act separately in the case of nitrous oxide is debatable.

To attribute to oxygen alone all the effects of this anæsthetic, will not account for all the phenomena of its affinity for certain parts and secretions of the body.

Exactly to what the human system will tolerate a variation from the natural, is best taught by chemistry and mathematics, but *felt* by experience. In the extracting department of our own office the average number of administrations of this anæsthetic per year, for the last four years, is over 1000 for extracting and minor surgical operations, patients and operator generally being pleased. We have refused to administer it in but few cases, and these in the last stage of consumption.

When air is breathed, carbonic acid is thrown off; when nitrous oxide is breathed there is less carbonic acid, "a priori," if more oxygen, less acid.

That nitrous oxide unites with the blood, as in the case of chloroform and with ether, thereby producing a detrimentally altered blood,

we are not fully prepared to believe. That it does *mingle* with it is to us highly probable.

Ziegler says it superoxydizes it, and admits that the nitrogen and oxygen act separately and conjointly. It is the blood that feels, by the operation of the nerves. It takes the blood 3 to 8 minutes to make the circuit of the body, but by this powerful permanent stimulant, anæsthesia obtains in half this time. Therefore we infer, since the arteries contract, a large volume of blood is thrown upon the nervous system, resulting in anæsthesia, not so much by an accumulation of carbonic acid, as by an exalted vital development.

In conclusion, if the position be tenable that so administering pure ether (with a slight admixture of air), that none of the vapor can escape into the room, thereby concentrating its *power*, then that class of patients may be very much lessened of whom it is said they cannot be brought under its influence, and neither patient nor operator will be subject to its tenacious, and to some, intolerable odor, which, added to the now common nausea, form so great an objection to its use.

Acetic acid results but little in its careful handling.

Chloroform administered in the same manner, with the exception of adding much more air, is invaluable as a last resort. Administered too rapidly, formic acid results.

Nitrous oxide is peculiarly adapted to our practice. Its narcosis is long enough for ordinary operations. Its application is as universal as its effect is uniform, and its product not a foreign substance.

Adjourned till 2 P. M.

THIRD DAY—EVENING SESSION.

Called to order at 2 o'clock, the President in the chair.

Reading of the minutes dispensed with.

Dr. Cushing:—Offered the following resolutions, which were adopted:

Resolved, That the Treasurer be instructed to open an account with each member of this Society, and to keep thereafter a correct account with each of all debits and credits, and that he furthermore be instructed to notify all delinquents of their arrearages, and to request a prompt settlement.

Resolved, That the Secretary be requested to make a roll of

the active and honorary members of this Society in the book of records, which may always be accessible and can be revised as may be necessary in the future,

The following were offered by Dr. Dean:

Resolved, That the thanks of the Society be cordially tendered to our professional brethren from Missouri, who have met with us at this and former meetings. Adopted.

The subject of Anæsthetics was resumed.

Dr. Cushing:—Thinks we do not hear as much of the bad effects of gas, now as formerly, but its careful preparation should not be overlooked.

On motion the subject was passed, and the next subject, Mechanical Dentistry, was taken up.

Dr. French offered the following resolution:

Resolved, That in the opinion of this Society the welfare of patrons, as well as our own interests, will be promoted by a general return to the use of gold or other metal plates, as a base for artificial teeth.

Dr. A. W. French:—Made some remarks, on the subject of artificial teeth, in support of the resolution. Has always opposed the use of rubber and still does so: makes as many plates of gold as of rubber. Thinks that gold, silver and aluminum should resume the places which have been usurped by rubber by virtue of its cheapness solely. Objects to it because it is very bulky, injures the soft parts of the mouth, promotes absorption of the jaw, is inartistic, &c. As it is detrimental to our patrons the use of it is against our own interests. Perhaps if only the better class of dentists made discriminating use of it, it might be better; but the best operator can not make artistic or natural looking work of it; can tell such sets as are usually made of it at the distance of a block. One style of work which in the march of improvement has been left behind, he thinks is not valued according to its merits. This is the plain teeth on gold plate. In cases where the gold is not exposed to view by the elevating of the lip, as fair a set can be made in this style as in any other in our repertory. The teeth can be placed irregularly, the incisors turned from the curve of the arch, and a very natural effect

be produced. The teeth having but a small base can be accurately fitted by grinding, and any interstices accidentally left may be filled with foil while the set is in the plaster preparatory to backing, the riveting to be done without taking the tooth from the plaster. The solder flowing under makes a perfect joint. A set of this kind is more cleanly than one made of gum teeth, and is the least bulky of anything having sufficient strength. Teeth attached to gold by rubber make a neat style of work, but the thick, inflexible blocks of teeth designed for rubber sets in many cases cannot be brought into a good position, and when this is the case they present the same ugly aspect as those upon rubber. These remarks apply to whole arches: for partial sets of less than eight or ten teeth, he uses gold with either plain or gum teeth, as the case requires, exclusively. Thinks continuous gum the perfection of artificial work in the artistic point of view, but was obliged to discontinue the use of it for certain reasons pretty well known to all who ever tried it. Thinks a general return to the use of metals would be creditable to the profession.

Mr. S. R. Bingham:—Being called for, stated that he did not know why he was called out except to make sport for the Society at his expense. He thanked the Society for the privilege of listening to the discussion. He might be regarded as a sort of lobby member, having an axe to grind, but he assured the gentlemen that his axe was bright and sharp, making a clean cut. He had been sixteen years in business relations with dentists, and had noticed a constant improvement in the science, which called for a corresponding increase of facilities by those who supply dental wants. The proprietor of his house was now, as ever, engaged in the earnest and sincere effort to elevate the profession, and they would still continue the same endeavor. Mr. Bingham thanked the Society and retired amid applause.

Dr. French:—Stated that when he first began to practice where he now lives, he sent to St. Louis for pivot teeth, specifying incisors and canines, and the answer came back that no one in the house knew the difference. This was the state of dental depots in those days.

Dr. Eames:—Being called for, said: In the great advance

Dental Science has made in the past few years, the Mechanical has not kept pace with the Scientific and Operative departments. This is due mainly to the change which had taken place in the system of dental education, especially in office instruction. Formerly the student was admitted only to the laboratory of his preceptor; there he spent the time of his pupilage, receiving oral and practical instruction in the mechanical departments. The operating room was closed to him, practically, hence his instruction in this department was confined almost exclusively to what he might gather from the few text books at his command. The change in the mode of filling teeth,—the use of adhesive gold, with the aid of the mallet, has opened the operating room door and admitted the student as an assistant at the operating chair. Again, the introduction of Rubber as a base for artificial teeth, and other cheap bases, has revolutionized the mechanical department. It has been the means of introducing into the profession a crowd of quacks who now disgrace it, and in consequence the better class of operators have given up the Laboratory almost entirely, hence we see the cause for the change observable in dental instruction, the result of which any one can see. There has been, really, no advance made in the mechanical department since the introduction of rubber, except the improvement in continuous gum work, and the use of rubber in combination with a metalic base. Many patents have recently been granted for what is claimed as great improvements, but which in reality are old ideas, many of which have been tried and long since discarded, possessing no practical value. The claims of many of these recent patents are not tenable, and should be discountenanced as swindles upon the profession. The Goodall patent elastic spring plate being nothing more or less than what was known years ago as the spring stay clasp plate, is not, therefore patentable. The Reynold's Patent is for a process known and used by the profession generally ever since the introduction of rubber. Also, what is known as the Stuck & Owen Patent, which, with the exception of one step in the process,—that of perforating the impression—has no claim to originality. Substantially, this process had been used by others and presented to the profession years before this

patent was granted Stuck & Owen. The Adamantine base, and several other similar cheap bases, are now being introduced; they are simply modifications of the old Keoplastic base, some little improvement being made in the compounds and the mode of manipulating them: they may be used as substitutes for rubber base, requiring about the same time and skill to construct a set of teeth on this base as on the rubber, and at about the same cost. The attention of many in the profession has been turned to the working of aluminum as a base for artificial teeth, but until quite recently with little success. As the result of the experiments made in this direction, we have several new patents on the use of aluminum as a base, some of which seem to possess some little practical value. Some six or more of these patents are for as many different modes of attaching teeth to aluminum base by means of rubber or adamantine metal. The one recently issued to Dr. E. Hale, is, he thinks, the most practical. It consists in raising a ridge around the plate on the lingual surface, on a line with lingual border of the teeth, by swedging, thus forming a channel on the palatine surface for the rubber attachment, corrugating the plate, rendering it stiff without much additional weight. It is capable, also, of a much neater finish than any other style of which he has any knowledge. Dr. Bean's process of manipulating aluminum has not been generally adopted on account of the great expense and skill required in its use. Dr. Starrs' process of soldering teeth to aluminum by means of a solder composed of tin and aluminum in the proportion of 1 to 7, is found to answer a very good purpose in many cases, while in others it is perfectly worthless, the solder rapidly oxydizing and breaking loose from the plate. Considers rubber as a base for artificial teeth a curse to the profession, and in many cases detrimental to the patient. Has seen reported cases where the patient has been seriously injured by the use of it; does not think it as lasting as some of the other cheap bases; has discarded the use of it in his practice altogether.

As to what is to be done with this rubber question, would say: that the Goodyear claim has been sustained by the courts. The Cummings claim is doubtful, has not been tested. The Good-

year patent expires in 1872. This patent covers the use of rubber vulcanized by the aid of sulphur.

The agents of the Vulcanite Company, of Boston, are now visiting the profession generally, gathering in their harvest. They propose settlement for past infringements on certain terms, which are varied to suit the length of the victim's purse. Would advise all those having means, to settle on the best terms they can make, thus avoiding costs.

Dr. Rivers:—Proposes to quit the use of rubber when he can get the excuse of interference by the company.

Dr. Kilburne:—Spoke of a case of loss of appetite and flow of saliva from the use of rubber.

Dr. Lewis:—Enquired whether the bad effects of rubber were attributed to the mercury. He spoke of the appearance of the gums like that of raw beef, but ascribed it to the non-conducting properties of the rubber. Finds the effects in his own mouth to be a painful burning sensation.

Dr. Kilburne:—Said a rubber plate of dark color produced no trouble where the lighter did.

Dr. Sturgiss:—Said he thought he never saw a mouth entirely free from bad effects when rubber was used. Had used gold foil on upper surface with good success but it would wear off. Would like to see rubber abandoned and recommended gold in all cases when left to his judgment.

Dr. French's resolutions were unanimously adopted.

Dr. Kilburne:—Offered the following:

Resolved, That in the opinion of this Society the inhaling apparatus for administering nitrous oxide gas, ether and chloroform, devised and exhibited by Dr. O. Wilson, of Aurora, is the best yet presented to the profession and well worthy of a trial.

Dr. Crouse:—Having used Dr. Wilson's inhaler for nearly a year, I can speak from practical knowledge of its worth. It is so much superior to any instrument now in use, that no one using it can afford to be without it. Amongst its advantages,—first, you can see the valves working during the time the patient is inhaling the gas, and know that all is going well: then it has a valve which is held shut when you wish the patient to have the gas, and which

left open shuts off the gas entirely, avoiding the necessity of turning a stop-cock to prevent the gas from escaping; also you can leave this valve open and allow the patient to breathe atmospheric air till all fear is removed, which is a great benefit many times. Suffice it to say, that it possesses so many advantages that any one once using it will not be without one. Dr. Wilson has labored faithfully in perfecting this instrument for the good of the profession, and having made an instrument so much superior to all others now in use, I feel sure his services will be appreciated and the profession much benefited thereby.

Dr. Wilson:—Said that this was unexpected and highly pleasant to him, and thanked the Society for its recommendation. The gas inhaler is a success, the other is more an experiment. It is intended to avoid the danger attendant upon the use of these agents. The workmanship of the specimen was not as perfect as it should be.

Dr. Crouse:—Thought the workmanship not essential and the instrument a superior one.

Dr. Wilson:—Moved a vote of thanks to Drs. Smith and Lewis, of the late executive committee, for their services in regard to this meeting. Carried.

Dr. Eames:—Invited the Society to the meeting in St. Louis.

Dr. Rivers:—Moved that the Society adjourn to meet in Bloomington, on the second Tuesday in May, 1870. Carried.

The Society was then declared adjourned.

C. Stoddard Smith, Sec'y.

AMERICAN DENTAL ASSOCIATION.

The Ninth Annual Meeting of the American Dental Association will be held at Saratoga Springs, N. Y., commencing Tuesday, August 2, 1869, at 10 o'clock, a.m. The following form of certificate was adopted at the last meeting of the Association:

"This certifies that ———— was duly appointed a delegate to the American Dental Association, on the —— day of ——, 18—, by the Dental Society of ———, and that said ————

is a dentist of good character and standing, and at this time in regular practice."

No delegate will be admitted without he answers the requirements of this certificate, which he must bring with him, and present in person. Accommodations will be secured for those giving early notice to Dr. J. G. Ambler, No. 25 West Twenty Third Street, New York City.

There is reason to anticipate a profitable and enjoyable session, and it is hoped that representatives from every Local Society in the United States may be present.

JAS. MCMANUS, *Coresp. Sec'y.*

The Missouri Dental Journal.

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HISTORY OF DENTAL CALCULI.

Read before the Missouri State Dental Society, by HENRY S. CHASE, M.D.

Dental calculi, salivary calculi and tartar, are terms used synonymously, to represent those various incrustations upon the teeth with which the Dental Practitioner is so familiar.

These incrustations are found not only upon the teeth of the human species, but on those also of various domestic animals.

Whether in the human or brute kind they are never physiological. Although they are not always the result of disease, yet they *are frequently* so, and *are* always the effect of a mal-physiological condition.

Dental calculi have their analogues in urinary calculi, calculi of the salivary glands, and in those portions of the body also where calcareous depositions take place without being organized into a distinct tissue.

In ossification of the valves of the heart, the meninges of the brain, the arteries, and in the bursæ of the joints, as well as in the substance of various muscles, true ossification is not always present. A mere infiltration of lime salts into the substance of a tissue is not ossification, but calcification. Without the distinctive cells which belong to bone there is no osseous tissue, no matter what amount of calcareous deposition there may be present.

In what is termed ossification of the dental pulp there may be instead of bone cells distinctive dentine tubes, and then we have dentification; and we sometimes find, also, neither bone cells or

dentine tubes, and then have only *calcification* of the *original* tissues of the pulp.

Microscopical examination of dental calculi, urinary calculi, or the calculi found in the salivary glands and ducts fail to show any vital or even regular organization.

Each and all of them show not a homogeneous structure, but one of various substances united by mere accretion. They are mere depositions of various substances found in the blood and in the viscus, gland or duct, in which the calculus has been formed.

They are mainly composed of the various salts of lime, together with more or less animal matter, such as mucous cells and epithelium scales. The animal matter is undoubtedly the principal bond of union between the saline particles.

Dental calculi have no uniform chemical composition. Indeed so far as *quantitative* analysis is concerned, there is no *approach* to uniformity, such as we find in dental, osseous, or other organized tissue, whether animal or vegetable. Nearly all of them however, contain more or less of the same substances, as we might expect, being formed in the oral cavity. But if they are mere accretions and not distinctive vital organizations, then we might reasonably expect that the habits of different individuals would vary more or less the composition of dental calculi. And such is the fact, for calculi formed in the mouths of tobacco smokers have traces of nicotine, and in those of tobacco chewers of particles of the plant itself.

Chemical analysis is not necessary to prove this, for incineration of a lump of dental calculus taken from the mouth of a tobacco chewer or smoker, will prove this to the undoubted satisfaction of the olfactory organs.

M. Caventou found in the salivary gland of an Ass a stone which, on analysis, showed 91.6 parts of carbonate of lime, 4.8 of phosphate of lime, and 3.6 of animal matter.

M. Henry, jun., found the dental calculus of a horse to consist of carbonate of lime 85.52 parts, carbonate of magnesia 7.56, phosphate of lime 4.40, and 2.48 parts of animal matter.

In an analysis of human dental calculus by M. Peps, there were found phosphate of lime 70, fibrine 18, animal fat 6, loss 6.

A great variety of theories have been advanced to account for the source from which dental calculi are formed.

As all the substances contained in them are also found in the *mixed* saliva of the mouth, I think that we need not seek further for their source.

The following analysis, by Bidder and Schmidt, does not vary materially from those of various other authors.

In 1000 parts of human saliva, there are:

Water	995.16
Epithelium	1.62
Soluble organic matter	1.34
Sulpho-Cyanide of Potass.	0.06
Phosphates of Lime, Soda and Mag.	0.98
Chloride of Pot. and Sod.	0.84

I have said that dental calculi are formed by accretion, that is by successive deposits of the organic and inorganic substances held in solution by the water of the saliva, which we have seen constitutes its greatest proportion.

Although dental calculi are so common, yet there are persons who never have any depositions of this character. I think they are mostly, and perhaps nearly altogether, found in persons leading an artificial life. And I think this will apply also to the brute creation as well as to the human family. Horses and other domestic animals, in which dental calculi are found, are not in a perfect physiological condition. Especially is this the case in regard to the character of their food.

Our patients on whose teeth we see these calcareous deposits of course all lead artificial lives.

Men and animals in a natural condition all partake of food which causes considerable attrition of the teeth,—food which requires much mastication for its comminution. This attrition would necessarily remove the slight depositions which might take place on the teeth between the acts of eating. We find, indeed, that those persons who are at all predisposed to dental calculi, who masticate their food only upon one side of the mouth, and who do not use the tooth brush thoroughly, have upon that neglected side large deposits of *tartar*.

In the mouths of those who do not brush their teeth, we find

the largest masses of calculi in the vicinity of the mouths of the salivary ducts. Thus the molars of the upper jaw, and particularly the second molars, which are opposite the mouths of the parotid duct, receive the greatest amount of this deposit.

In the under jaw the incisors and cuspids on their lingual surfaces may be covered thickly by tartar when the teeth farther back in the mouth are free from it.

These deposits form most readily about and upon undisturbed objects. They are not readily formed upon the mucous membrane of the bladder because its epithelium is being continually thrown off into the urine and cast out of the viscus, together with the calcareous matter held in solution by the urine. Besides the muscular contractions of the bladder are inimical to the quiescence of urinary deposits, even in persons predisposed to them. On the other hand if hard or insoluble substance is introduced into the bladder which cannot be voided with the urine, it will very soon receive an incrustation if the person retaining it is predisposed to stone in the bladder.

In the mouth we have conditions very favorable to calcareous accumulations. The teeth are immovable. They are irregular in shape. There are crevices between them: they are composed mostly of lime themselves. They cannot expand and contract and thus break up the adhesions of incipient calculi.

The salivary glands from which the calcareous matter of dental calculi is formed cannot be called *excretory* organs. Their product is intended to assist in deglutition and digestion, and as such is also intended to be again absorbed into the nutritive system.

The kidneys, on the contrary, are excretory organs, and are intended to select from the blood effete material and cast it out of the body through the uriniferous tubes.

In those portions of the world where the water used by the inhabitants is loaded with large quantities of inorganic material, it is found that urinary calculi are more frequent than in countries whose waters are more pure. But this rule, so far as my knowledge extends, does not hold good in regard to dental calculi.

I am not aware that the saliva of limestone districts varies from those of granite regions.

Neither do I find that those persons whose blood is abundantly supplied with lime salts, more disposed to dental calculi than others, other things being equal.

In some *pathological* states of the system the salivary glands do undoubtedly take on excretory action, especially is this the case in mercurial diathesis.

In scorbutic conditions also this is the case, and we find in both of these diseases a great predisposition to dental calculi, and very frequent operations are necessary to remove it, besides the constant care of the teeth by the patient.

In non-phosphorized people—those suffering from malnutrition in being deprived of phosphorized lime salts in their food—we find dental calculi of the white and soft variety.

As unvitalized lime salts will not form a portion of the tissues, and are therefore effete be they never so abundant in the blood, therefore water containing carbonate of lime in abundance cannot take the place of food prepared by the Creator, containing vitalized salts of lime.

But those persons who partake of food usually rich in lime salts, supply their blood abundantly with them, and although these effete inorganic materials are generally cast out of the system by the action of the kidneys, yet as I have before said, in those conditions of the body which cannot be called strictly physiological, these effete lime salts may be carried through the circulation of the salivary glands and become excreted.

The saliva then being loaded with an unusual amount of lime salts, the latter may be thrown down and deposited upon the teeth, which are well calculated to receive them.

When the mixed saliva of the mouth is evacuated into a test tube and allowed to stand for a short time, a large amount of matter is seen to be deposited in the bottom of the instrument. If the supernatent liquid is poured off and more saliva is added, another equally large amount of salivary matter is deposited. The sides of the tube also receive a thin deposit which adheres firmly to the glass.

After a while a thick deposit of calcareous and other salivary

matter will be found there, and there we have the initial formation of salivary calculus.

This is undoubtedly the way in which dental calculi is formed. The deposition no doubt takes place mostly during sleep, when the tongue and other muscles of the mouth are not in motion, and when the conditions for its undisturbed formation are most favorable.

Breathing through the mouth instead of the nostrils during sleep is also favorable to the deposition of salivary matter, as evaporation of the water of the saliva takes place to a considerable extent from the surfaces of the teeth which are wet with it.

The posterior surfaces of the under incisors and cuspids would receive the greatest current of air, and consequently the greatest evaporation would take place from those teeth.

It is well known that this particular location is the most common of dental calculi. Some persons who never have these accumulations on the other teeth, are annoyed by their frequent formation here.

Adults and elderly persons are more liable to dental calculi than children or young persons.

Children not having yet attained their full development usually require all the lime salts which their blood contains for the building up of their tissues. And it is very likely that the saliva of such individuals is not so rich in inorganic materials as the aged, although I am not aware that any analyses have been made with reference to this point.

On the other hand, the aged having attained their full development, require less calcareous matter for their vital processes, and the super-abundant portion is therefore more likely to be found in the saliva, and become deposited in the mouth in the shape of dental calculi.

The same theory is equally applicable in regard to the urinary calculi: and it is notorious that the aged are far more liable to these concretions than young persons.

Dental calculi, for obvious reasons, do not produce the same disastrous results that urinary or other calculi do. In the oral

cavity their formation may be watched: their diagnosis is easy, and the operation of removal is simple.

Some very ludicrous mistakes have been made by medical practitioners in reference to these calculi. They have in numerous instances been mistaken for osteo-sarcoma, when of such extent as to involve several teeth, and to completely conceal them by an enormous deposit.

The dental practitioner not unfrequently sees them completely covering and concealing three upper molars.

The influence upon the gums and other soft tissues which these rough concretions abrade and irritate is also calculated to mislead the physician.

Inflammation of the gums and the pericementum is a common result. Suppuration of these parts frequently ensues. Fistulas are sometimes produced in the cheeks.

Dental calculi never decay the teeth upon which they are situated. On the contrary, their effect is sometimes conservative. I have often seen a neglected cavity of decay filled with tartar which had accumulated from non-mastication of food upon that side of the mouth upon which the tooth was situated. In these cases the cavities had ceased to be enlarged.

Pericemental inflammation, periosteal inflammation, loosening of the teeth, and their consequent loss are the usual results of neglected calculi.

These results are certainly serious enough, and imperatively call for their prompt removal after being formed, and for such hygienic measures also, as shall prevent their formation.

These preventative measures are simple, and may be easily stated as follows: brush the teeth thoroughly morning and night, using some simple dentifrice, having prepared chalk or some similar earth as a basis.

Masticate the food upon both sides of the mouth.

Choose food which *requires* mastication to prepare it for comfortable deglutition.

Keep the mouth closed during sleep.

The operation of removing dental calculi should always be with *instruments*, and never with anything intended to dissolve

them. No one but an ignoramus or an impostor would attempt the latter mode; and yet we often hear of its being done in this manner. Whatever will dissolve a salivary calculus will also dissolve enamel and dentine. A knowledge of this fact is sufficient for honest practitioners.

As this paper is sufficiently long, I shall say nothing about the operation for the removal of dental calculi, although it is as important and delicate a one as any which we are called upon to perform; and I may safely say, one which is more hastily performed and slovenly done than any with which the dentist is familiar, by, I am sorry to say, many otherwise excellent operators.

ETHICS.

Read before the Missouri Dental College Association by H. E. Peebles, D.D.S.

Ethics.—The doctrine of morality or social manners: the science of moral philosophy which teaches men their duty, and the reason of it. Paley.

A system of moral principles: a system of rules, regulating actions and men in society. Webster.

Ethics, regards mental dispositions; Jurisprudence regards outward acts. The former extends to all moral qualities. No written law can enjoin gratitude or generosity.

Ethics is not like Mathematics or Metaphysics: an independent science. It rests upon physiological and theological principles, and deals with their application and operation only.

Ethics takes a dynamical and not a statical view of the elements of life, and presupposes that humanity, that is to say, human liberty, has the power to employ its mental and physical capacities as it will, and determine the end toward which they shall be directed.

The earliest ethical speculations in Greece appear in the maxims of the gnomic poets, and are rather vague and crude.

The first attempt ever made to introduce a scientific analysis into the details of practical wisdom, so far as your essayist knows, was that of Pythagoras about 530 years prior to the Christian era.

The ethical formulary of this Greek philosopher, of whose writings so little have been preserved, may be expressed in the following words:

"Virtue is the harmony of the soul, and its similitude to God. The aim of life, is to make it represent the beautiful order of the universe."

The ethical formulary of the German metaphysician Kant, is this:

"Act only on such a maxim as may also be a universal law."

That of De Wette, the German theologian, is:

"Live in order to live, and out of pure reverence and love of life."

The Italian school of philosophy, of the present century, presents the subject of ethics under new phases.

Virtue, according to Rosmini, is founded on the idea of possible being. Universal being is the absolute good, and the principle of every particular good. The first precept of the moral law, therefore, is to love being as such. Hence the formula under this improved code is, love intelligent beings, not for themselves, but for the supreme end; which is GOD.

Virtue consists in the conformity of intuitive and reflex knowledge, and its essential TRUTH.

Obligation rests the power of rational decision on what a person knows.

Moral law, in its general broad terms, commands: to *do good*.

Duty requires the accomplishment of the part assigned to each individual, in working out the supreme end of society.

The law of progress requires in the moral, as in the material world, an ultimate perfection in an immortal state, as the good of humanity.

Ultimate law cannot be considered independently of religion, because it is GOD Himself. Hence God as the absolute law, reigning over the free human will, is the condition of obligation.

A complete moral system states the supreme good of man, as the fundamental moral principle, which should guide his actions and his particular duties to himself, to mankind and to GOD.

Christian ethics, therefore, is the doctrine of christian life, em-

bracing so much of dogmatics as pertains not to knowledge, but to actions, and differs from philosophical ethics in its subject, which is man—but man as a christian.

Upon this broad, deep and solid foundation, we must build up our professional code of ethics.

Professional ethics, as philosophical and christian ethics, has man as its subject, but man as a professional tegrality, to be sure, but still we cannot free him from the full force of all the obligations imposed by the strictest moral code.

If man has the power to control his mental, moral and physical capacities as he will, then indeed we have a right to demand that he so direct these capabilities as to secure to himself the greatest amount of happiness, to his fellows the greatest amount of good, and give to God the greatest glory.

In assuming the titles and dignities of any association, society, order or profession whatsoever, the individual also assumes, or incurs, all the obligations, duties and risks, thereto of right belonging.

And if, as contended for above, "duty requires the accomplishment of the part assigned to each individual, in working out the supreme end of society," then it follows that we as a society, or profession, have the undoubted right to demand of each other, all and singular, that the just performance of all known professional duties be discharged in strict conformity with the ability of the individual, and agreeably to the light then before the mind. And we assume that no man has a right to enter a society, or a profession, or a mechanic art, before he has taken the necessary steps, and availed himself of the proper training to fit him for each and all the duties thereto belonging. We often hear it said a man has a right, in this free country, to do as he pleases. This is true only in so far as he pleases to do right. It is not right for any man to assume the functions of a professional gentleman until he is properly qualified to discharge his duties in accordance with the rules and regulations, the science and customs of that profession.

A man may be versed in science, he may, if you will, be a good lawyer, but without a correct knowledge of medicine, he has

no right to assume the duties of a physician. Or he may be a well qualified general surgeon, or a general practitioner of medicine, and still be unqualified to teach or to practice oral surgery or dentistry, and therefore have no right to assume its functions.

Again, it is assumed that oral or dental surgery, is not, and never will be independent of medicine, but it is a specialty in medicine, and therefore it is bound to observe and respect the long established etiquette and deportment that govern in medicine.

Assuming that the above proposition is incontrovertible, it follows as a sequence that we, as oral surgeons, in order to hold and occupy our normal relation to the great and justly honored medical fraternity, must conform to the established customs in the profession.

The medical man requires a thorough literary course of instruction, followed by a complete medical education, to fit him for practice. And we need just such a course of study for our young men, and then engraft or superadd to this healthy stock, our *special* instruction or mental and physical training, in order to make full grown specialists; such specialists as will reflect credit upon the title of Doctor and give tone and character to oral surgery.

But the ground work of true professional character lies still back of all this—it is *honesty*. Sterling integrity—a love of truth for truth's sake. No man is reliable who does not love and venerate truth.

All men cannot arrive at the highest point of excellence in manipulative dexterity, but all men can be honest.

That we should all be honest, truthful men, of undoubted integrity, refined and polished gentlemen, and earnest workers in our calling, is due to our profession, it is due to our patients, and due to ourselves: we owe it to those who love and venerate us: yes more, we owe it to posterity. No man has a right to tarnish his own reputation, or to stain his fair escutcheon.

In our profession, as in other departments of human industry and usefulness, there are many avenues opened to our selfish hearts, and strong appeals made to poor, frail human nature to

turn from the straight and narrow path of right, of virtue and integrity: and indeed, I have thought sometimes in fierce conflicts with temptation, that the dentist is tried more frequently and severely than men in other pursuits in life. Be this as it may, we are tried often, tried severely, and it requires much nerve, firmness and humble trust in a higher power, to always resist the temptation to take the short cut or by-path to attain to or arrive at the end sought than the world is aware of. Here I might elaborate this thought, and call up in your minds, gentlemen, numerous cases, facts and incidents connected with your varied and separate practices, illustrative of the subject, showing you where your integrity, your veracity, or your patience was put to the test: or where your best efforts to succeed in accomplishing desired ends, culminated in miserable failures: or where your most generous deeds were unappreciated: or where it may be, after long, faithful, and most fatiguing labor to successfully fill a tooth, or adapt a denture, your toils and anxieties were rewarded by ingratitude and abuse. But I do not feel at liberty to indulge in these reflections at this time and in this connection.

Should I attempt to paint a picture of the true specialist, I might name as some of the lights in his portraiture his better qualities, and qualities of a negative character as the shades. But lest I weary you, and make manifest my great deficiency in word painting, I shall simply attempt a mere outline sketch of the morale of the true oral surgeon. Let him be honest, earnest, candid, industrious, studious, truthful and firm. He should have skill, tact and prudence. He should possess suavity of manner, ease and grace. He should not be deficient in sympathy for his suffering patient, nor should he be easily irritated. Bold and yet cautious. With a sound and cultivated judgment. To adorn all, he should be an educated and refined christian gentleman.

Possessing all these lights, there are no places vacant for the grosser shades of rudeness, vulgarity, coarseness, profanity, or laziness: and the lighter shades of fouling the breath with tobacco or beer, or of personal neglect, carelessness, or indifference, should be laid aside.

His rooms should be comfortable and convenient, and so far as practicable, they should be free from disagreeable odors or sounds. The inordinate smell of creosote or tobacco smoke, foul gutters and yards, the noise of rude or rollicking children, the barking of dogs in, or around the rooms, as well as the slamming or banging of doors should be avoided or abated if possible.

Silent quietude, salubrious air, a vase of gay, sweet flowers in the room, accompanied with gentle manners, conspire greatly to soothe and quiet sensitive nerves.

These little things—small, indeed, in themselves—like the living cells in the animal economy, aggregate and make up the whole.

Operative and Surgical Dentistry.

ORAL SURGERY.—CANCER.

The time is not far distant when the operative dentist will be an oral surgeon in its fullest sense. He will not only be able to *treat* the teeth, but he will also prescribe for all mal-conditions of that cavity, regardless of the tissue affected. His *operations*, besides those upon the teeth, will include removal of tumors, whether mild or carcinomatous, and removal of the maxillary bones. Not only will he be competent to do this, but he will be *expected* to do it, as the public becomes educated to a higher standard.

The skill required to perform amputation of a maxilla is not so great as that required to plug a tooth well. Nature assists the surgeon in performing operations on the softer tissues. She renders no service in restoring a decayed tooth to health. Anatomical knowledge of the parts and courage is the most which is required to sustain the operator in removing tumors and maxillæ.

Few dentists have ever removed an upper maxilla. Few ever had the opportunity. Very few feel competent. Last year a

Missouri dentist had the honor of performing it in a successful manner.

Iowa now claims the same honor. Dr. Taylor, dentist, of Ft. Madison, lately informed me that he removed the left half of the upper maxilla, for a lady (I think) on account of a cancrous tumor, and supplied the mouth with an artificial substitute for the lost part. The whole operation a complete success so far.

The removal of tumors from the jaws is merely a mechanical operation, requiring, as before said, an intimate knowledge of the parts involved, courage and dexterity. But removal of tumors or diseased parts does not always answer all requirements. If the growth is benign, in contra-distinction to malignant or carcinomatous, then the local treatment will be undoubtedly sufficient. But if it be malignant, no matter by what name it is called, then the local treatment is but the first step towards cure. Many medical men deny that cancer is ever cured.

This is not true however. Malignant growths are very apt to return to their former seat, or to some other locality. Malignant growths, under the microscope, appear very different from benign growths. There is the *cancer cell*, which is diagnostic of this disease, and it may always be found in the juices of the diseased tissues.

Cancer is not merely a local disease. Cancer dyscrasia may be present in an individual for many years, and not show itself until some light wound or bruise invites it to localize itself.

A mammary gland may be bruised by a fall or a blow and immediately swell to a small extent. In a *healthy* constitution it will recover its normal condition in a short time. In a cancerous diathesis it may invite the disease. Then the tumor continues to grow until its true character manifests itself by cancer cells taken from its substance.

If the breast is now extirpated will the disease return? Most likely it will if treatment is not continued. Extirpation of the breast has removed a portion in which the proliferation of cells was going on rapidly. These cells circulate in the absorbent system, but are continually invited home to the suppurating mammary gland. When the gland is removed there are more or less

of these cancer cells in the absorbent vessels, and as the dyscrasia of carcinoma is still present in the system, they find a new home in some other part of the body.

Now unless these cancerous cells can be destroyed and the predisposition to their formation be removed, it can be but a *temporary relief* to extirpate a cancerous tumor.

There is doubtless a time in which there are no cancerous cells in a tumor which will afterwards contain them. This is during its first growth. Here, then, is an indication for its early removal.

Many such tumors have been removed, and as they did not return, some persons would pronounce them not cancerous.

It must be set down, then, that the greatest safety is in the *early* removal of all tumors, or growths pathological.

But even if a growth is removed before there are cancer cells formed, if the dyscrasia still remains in the constitution, it is liable to localize itself whenever invited by favorable circumstances.

Is there any way of removing cancer diathesis? Undoubtedly it has often been done, sometimes by one remedy and sometimes by another. All constitutions do not respond to the action of the same remedy alike. A cancerous diathesis may be present in very different constitutions, and the remedy consequently must vary according to the indications present in different constitutions.

As this cancerous diathesis is a long while forming, so it cannot be suddenly removed. Months and years must elapse before it would do to give up medicating for the removal of this terrible dyscrasia. It seems perfectly puerile to remove a malignant tumor, and then send the patient away without a thought of the constitutional disease.

Conium, belladonna, arsenic, hydrastis canadensis, are the principal constitutional remedies, and have been found effectual in the entire removal of the cancerous diathesis.

But I did not intend to give the treatment or even much of the history of cancer.

My object is gained if attention is drawn to the superlative

importance of continued constitutional treatment after an operation, even if the patient seems to enjoy perfect health. This disease is too insidious and treacherous to be trifled with.

C.

FILLING TEETH.

By H. Judd, M D.

Continued from page 345.

Assuming then that it is absolutely necessary that the cavity should be kept dry during the operation of filling, we proceed to discuss the best methods for accomplishing this object. We shall presume that no one will attempt to practice dentistry without knowing something about the use of napkins, wedges, spunk, bibulous paper, &c., but there are other methods which are not quite so universally known, and of these we propose to treat. A tongue holder of the most approved pattern, which can be had at any of our dental depots, although by no means a very modern invention, is not found in every dental office even at the present day, and I make this observation merely for the purpose of saying that if this should meet the eye of any one who has tried to *get along* without one, that nothing but the direct plea of necessity will exonerate him from great blame: for those who employ a professional man have a right to expect that he will provide himself with such instruments as are absolutely necessary for the performance of the operations that they require.

Compressors for the duct of Steno are very useful in many cases, but one can do without them with much less inconvenience than he can without a tongue holder. All of these appliances except the tongue holder, are, however, giving place to the rubber dam, which certainly supplies a want that had long been felt and which all other means combined have, to a great extent, failed to fulfill. Not but that a great majority of cavities were kept dry during the operation of filling, but the rubber dam does more than that. It not only protects the cavity from all the juices of the mouth, but also from the breath, which in some

cases is so laden with moisture that it destroys the adhesive properties of gold almost as completely as the saliva itself. But simple protection from moisture is not the only advantage gained by the use of the dam. After it is carefully adjusted and fastened in place, the operator feels that he has made himself master of the situation, and he can then operate coolly and deliberately; and however difficult the operation may be, a careful operator can scarcely fail of making a good operation when he can give his whole attention to the packing of the gold, and is not obliged to keep one eye and half of his thoughts directed to the saliva.

The operator will not only make much better operations under these advantageous circumstances than he possibly could if he was obliged to give half his attention to the saliva, but he will avoid all of the excitement and anxiety which often results from an apprehension of having a cavity flooded, with all the mortification attending the failure, and the extra labor of replugging; and as a matter of course, there will be a less expenditure of vital force, less exhaustion of both mental and muscular power, conducing not a little to the health and longevity of the operator.

Lest there may be some who have not seen the rubber dam used, we will give a few thoughts connected with its application that may be of service to those who are not adepts in its use.

We need hardly say that at this age of the world no one is at all excusable if he do not familiarize himself with its use as quickly as possible.

In the first place it is important that the sheet rubber should be of good quality, and it will be well to notice that much of that for sale at the depots is too thin, in fact so thin that it is nearly worthless for this purpose.

The size of the piece used will be very different in different locations. A piece two inches square for an upper incisor may in many cases be sufficiently large, but for a lower sapientia it may require a piece eight or ten inches square.

The hole through which the teeth are to be forced should be made about one half a line in diameter, and if the rubber is good this will be large enough to pass over the crown of the largest tooth without tearing.

Punches for this purpose may be found at all of the depots, which answer the purposes very well.

The dam, as a general thing, must be placed on two or three teeth, a hole being punched for each one, usually from one-eighth to one-fourth inch apart.

If the cavity be on the grinding surface of a molar, one hole may suffice, as it will not always be necessary to carry the dam over but the single tooth; but in approximal cavities two teeth must be embraced by the dam; and if the cavity be in a lower, or sometimes even an upper cuspid, it will frequently be necessary to include the lateral incisor and first bicuspid in order to be able to retain the dam in situ.

After the dam has been forced over the teeth, an assistant places a ligature around the tooth to be operated upon, which may be worked towards the neck of the tooth, and, if necessary, even under the margin of the gum with a blunt instrument, and then tied in a single knot, but with a double turn of the thread.

The ligature may be a piece of coarse saddler's silk, and should be well waxed. If the tooth to be operated upon be of such shape that a ligature cannot be retained upon it, the object may sometimes be attained by placing the ligature upon the adjoining tooth, which will frequently be necessary in the case of cuspidates.

If the teeth are placed so closely together in the arch that a ligature cannot be forced between them, either separate with a wedge, or pass a No. 1 separating file between the teeth.

But if the teeth upon which it is desirable to place the dam are so shaped that a ligature cannot be retained upon them, it will be necessary to use a clamp specially made for that purpose. I have found these clamps exceedingly useful in retaining the dam upon the lower second and third molar when the cavity was low down upon the labial surface, and especially when it extends under the margin of the gum.

The dam should always, if possible, be worked beyond the margin of the cavity which extends towards the neck of the tooth, and if the gum be hypertrophical, so as to interfere seriously with its proper adjustment, it should be sprayed well with rhigoline, and removed with a sharp knife.

Let it be remembered that the dam may be used almost any place where it is possible to plug a tooth with gold, though it will sometimes require a good deal of energy and perseverance to adjust it, but experience in this thing goes far to perfect one in the manipulation required for its proper adjustment in difficult locations.

In many places it can be placed upon a tooth in less time than would be required to place a napkin in the mouth: and as a general thing it is much pleasanter for the patient than napkins, bibulous paper, spunk, and the other appliances made use of for the same purpose.

I am aware that some have tried the dam and given up its use and do not consider it worth anything, but I think I would be safe in asserting that there is but one opinion among those who have learned to use it *properly*, and I have no hesitation in stating that among all of the valuable contributions that have been made to the armamenta of the medical practitioner for the last decade, no one has been as valuable as the Rubber Dam.

To be Continued.

[From the American Journal of Dental Science.]

PIVOT TEETH.

By James B. Bean, M.D., D.D.S.

Those teeth which are supported by the inter-maxillary bone, which receive their nourishment from a branch of the infra-orbital nerve, seem to be endowed with a peculiar vitality of their periosteum that enables them to be retained with impunity in the mouth after the destruction of their lining membrane, and even after they have been deprived of their crowns, and reduced to a level with the gums by filing or by caries. This peculiarity of the anterior teeth is of very great service, as it enables the dentist to supply the deficiencies so often caused by destruction and decay of these teeth, after proper preparation of the fangs, in the most perfect manner, and to secure to the patient a substi-

tute almost as useful as was the lost organ, and often more beautiful and pleasing in appearance.

The number of cases, however, in which artificial crowns can be attached to natural roots of teeth with entire success and permanent usefulness to the patient, are limited. Nevertheless, there are many cases in which this is the best possible manner in which we can supply the loss of these organs. The utmost resources of our art, therefore, should be brought to bear in producing a substitute that will give such entire satisfaction as a properly constructed *pivot tooth*.

In the cases for which we are called to operate, the crowns of the teeth under consideration have either been destroyed or disfigured by mechanical violence, or have been corroded by caries to such an extent that restoration by filling with gold would be impossible, or at least inadmissible. In the first class of cases, if the accident has not produced contusion of the periosteum, and consequent loosening of the tooth, and the fang has not been fractured below the margin of the gum, the operation may be performed at once, with the most complete success. And sometimes, after considerable inflammation of the periosteum, and consequent loosening (where the concussion has been severe), the tooth will in a short time become sufficiently firm in its socket to warrant the success of the operation. The second class is of more frequent occurrence, and if the teeth yet retain their vitality, and are firmly fixed in their socket, surrounded by a healthy gum and periosteum, the chances of success are most favorable, and, if proper pains be taken, the best results will follow.

The peculiar advantages claimed for pivoted teeth, are, that they can be immediately applied without the usual delay dependent on the absorption of the alveolus, and without encumbering the mouth with plates, clasps, &c., while at the same time they are much firmer, and more useful in the mouth than plate teeth.

The facility with which this operation may be performed has caused it to be resorted to by many unskillful practitioners, under the most unfavorable circumstances, by reason of which, it has gone into disrepute with many intelligent dentists. Yet the best operators, and the most eminent dentists who have ever

graced the profession have given it their sanction, and says Prof. Harris, "It is certainly the best method that can be adopted for replacing the loss of the six upper front teeth."

Many different methods have been proposed for the attachment of artificial crowns to roots of natural teeth, but before attempting any of them, certain preparations and precautions are necessary. The favorable indications already enumerated should be present if possible, and all diseased action in other parts of the mouth should be corrected by the removal of all old fangs and such diseased teeth as cannot be restored to a healthy condition, and the gums and living membranes of the mouth should be freed from all abnormal conditions by the removal of exciting causes, and the use of the proper remedial agents indicated. Moreover, the patient should have a sound constitution, free from any cachectic habit that might be prejudicial to success.

The method of fastening crowns of natural teeth to fangs in the mouth by means of pivots or tenons of wood, was practiced in the remotest antiquity, and has been described by the oldest dentists who have written on the subject of artificial teeth; and Bourdet, who wrote in Paris more than a hundred years ago, describes the manner of attaching a crown by wooden, and also by metalic pivots or tenons.

Since the introduction of porcelain teeth, this method has been practiced to a very great extent, and oftentimes by the hands of incompetent and inexperienced operators. The common practice is to merely mark the tooth with a file at the margin of the gum, clip off the crown with the excising forceps, extirpate the nerve with a drill and file to a level with the gum. And after filing the porcelain crown, and enlarging the canal of the root, a hickory pivot forced into each, driving the tooth close up to the gum, completes the operation, and the patient goes off highly pleased. But this pleasure is generally of short duration, for in a large number of cases so treated, inflammation of the periosteum, and suppuration of the remaining portions of the pulp ensues, and troublesome alveolar abscess is the result: often remaining as long as the tooth is in place. Numerous contrivances have been proposed to obviate this very serious difficulty; such as grooves and

perforations in the pivot for the escape of the purulent secretions. But there are so many serious objections to the use of wooden pivots in any of these forms, that they have been almost entirely laid aside by the best operators in the profession.

There are several different modes of attachment by metalic pivots that have been practiced by eminent operators, which are superior in most cases to wood alone. The English dentists have practiced for a long time the mode of attaching the tooth to a gold wire, wrapping this with silk, after being saturated with a thick solution of mastich, it is forced into the canal of the previously prepared fang. Others have used a simple gold pivot fitted into the root; but these soon become loose by wearing, and the action of the fluids of the mouth on the walls of the canal, and to obviate this, some have filled the canal securely with a pin of hard wood, and then drilled into the centre of this for the introduction of a close-fitting gold pivot. This method affords a very firm hold, and a tooth fitted in this manner will last many years, under favorable circumstances.

In all the foregoing methods described, the walls of the canal in the root to which the tooth is attached, are necessarily exposed to the action of the fluids of the mouth, and these by decomposition, become corrosive agents, gradually enlarging the canal, and finally entirely unfitting it for the retention of an artificial tooth. To prevent this destruction of the fangs, a method has been adopted of securing a gold tube in the canal, into which the gold pivot is accurately fitted, thereby making a very perfect operation. The manner of effecting this, will now be described in detail, and also the manner of attaching artificial crowns to molar teeth.

If the tooth still retains its vitality, the pulp being exposed, and the patient will not submit to its extirpation with an instrument, we at once decide on destroying its vitality by the application of arsenious acid, and this can better be done before the removal of the remaining portions of the crown.

The arsenious acid should be combined with twice its weight of sulphate of morphia, and intimately mixed with a sufficient quantity of creosote to form a thick paste, and having saturated

a very small pellet of cotton with the composition, it is applied directly to the exposed pulp, and the remainder of the cavity filled with wax and cotton, as directed by Dr. Maynard, or with tin foil packed moderately close. This is permitted to remain from ten to twenty-four hours, when the nerve will generally be found to have lost its vitality, and can be removed without pain, sometimes coming away entire.

If the tooth has already lost the vitality of its lining membrane, or as soon as its destruction is affected by the arsenic, or if the patient will submit to its extirpation by mechanical means, we proceed at once to remove the remaining portions of the crown: and this should be done with the greatest care, so as to prevent injury to the alveolo-dental periosteum, thereby lessening the probabilities of success. The best method is to use an instrument constructed somewhat like a file-carrier, with a very narrow main-spring saw about two inches in length, properly secured with clamps and screws, to a small bow similar to the saw-frame used by jewellers, except that the saw should cut at right angles to what it does in that instrument. With this contrivance the entire crown, or any portion of it can be removed without danger of fracturing the fang or injuring the investing membranes. Where the nerve still retains its vitality, the first contact of the saw would be productive of intense pain: therefore we should saw half through the dentine on all sides of the tooth, then clip off the crown with the excising forceps.

Having sawed off to as near as possible the proper length, the next operation is to remove any remaining portions of the nerves and blood vessels, and file off the end of the stump to a smooth surface, to within about one-half, or one-fourth of a line from the margin of the gum. Round off the sharp edges of enamel on the posterior and approximal portions, and bevel the anterior edge a little below the margin of the gum, giving it a slight concave appearance, so as to accommodate the neck of the plate tooth which is to rest against it. It is better at this stage of the operation, to stop the canal loosely with a pellet of cotton or floss silk saturated with spirit of camphor, and dismiss the patient for two or three days, when, if no inflammation be present, the ca-

nal may be cleaned out, and carefully filled, from the apex to within four or five lines of the orifice with gold foil. Any favorite method of fang-filling may be employed, but one of the best is to carefully introduce the first piece of gold in the form of a conical shaped "cylinder," rolled on a small five-sided broach till it is of a size and shape to fit the canal, then force it well to the apex with a straight fang-filling instrument; the remainder is then filled with pellets or ropes as usual. The remaining portion of the canal not filled, should now be enlarged to about one line in diameter, if the size of the fang will admit of it, down to the gold filling, making the bottom smooth and solid, and the sides parallel. The orifice, to the depth of nearly a line, is again enlarged with a bur to about two lines in diameter, and a small groove, or undercut is formed around the margin for the retention of the gold filling subsequently to be introduced around the tube.

For the tube, either the hollow gold wire described by Prof. Harris in his "Principles and Practice," or simple gold tubes, made of gold plate may be employed. If the latter be chosen, they may be formed by bending a piece of ordinary gold plate around a wire, so as to form a cylinder sufficiently large to fit the smaller portion of the canal prepared for it. Then solder with gold solder as fine as can be used. A piece of the tube half an inch in length should now be cemented with shellac into a hole bored through a piece of wood half an inch in thickness to serve for a handle, while the interior is carefully dressed out with a jeweller's broach which has a slight taper, making it smooth and regular within. A solid gold wire pivot is now carefully filed and fitted by grinding with fine emery and water, making a "ground joint," whereby the pivot is firmly held when in place. Any portion of the wire that may now project beyond the smaller end of the tube, should be cut off even, while at the larger end it should project at least one-fourth of an inch.

The tube must now be taken out of the cement, and a piece of plate soldered to the smaller end, forming a *bottom*. An easier flowing solder should be used for this, so as not to disturb the

first. This tube, or *dress cap*, thus formed, after being "pickled," and filed off smooth, is ready to be inserted into the fang.

Some have proposed to cut a screw on the tube with a screw-plate, and with a tap to cut a corresponding thread in the fang, whereby the tube is firmly secured in its place, and filled around with gold. But the most convenient way is to cut a number of barbs with a sharp knife on the outside, looking toward the open end, so as to securely retain it in place when filled around with gold. Being made so as to go into the root rather loosely, several folds of gold foil are wrapped around it, and after carefully drying the parts with bibulous paper, the pivot being in its place in the tube, the whole is forced to the bottom of the cavity, and the loose portions of foil cleaned away from around it.

Having previously prepared some adhesive foil, and suitable instruments all ready, keep the tube and root free from moisture until the space around the former is perfectly filled with gold, and perfectly consolidated. The gold pivot is now removed, and the tube carefully sawed off nearly level with the end of the fang. Then by filing and consolidating the whole must be made smooth, and the surface and edges of the end of the fang well polished. We now have the fang perfectly preserved, with a good filling, and a gold tube firmly secured in it, with a gold pivot accurately fitting the latter.

The next operation then is to secure a suitable tooth to the pivot, and for this purpose a plain plate-tooth is selected that will fulfill the requirements of the case in size and shape; the color, of course, should be as near the same shade of the adjoining teeth as possible—even a shade darker would form a less conspicuous contrast than any lighter. This tooth should be ground and fitted to the beveled edge previously formed on the anterior side of the root, so as to have the free margin of the gum cover the point of union. Then after soldering and finishing up a strong backing upon the tooth, it is fitted into its proper position, with the gold pivot in place, on which has been soldered a small shoulder or ring of plate, and the projecting portion of the wire cut off. The best method of securing the shoulder in its proper position, is to cut out a disk of gold plate larger than the diameter of the

pivot, which is perforated with a hole just large enough to admit the pivot up to the point at which it is to be soldered—and this should be a little less than the depth of the tube—and being retained at this point, it is made to fit closely down on the fang, the whole is then carefully withdrawn and placed up the ring in plaster and asbestos. If the ring be loose on the pivot it must be kept in place by a bit of wax or plaster while withdrawing them from the tube, and as soon as the investment of plaster and asbestos is dry the wax is removed, borax applied, and the piece soldered with *fine* solder. The pivot is now tried again in the mouth, and if the fit be satisfactory, the projecting portion is cut off and any prominence filed smooth so the backing and the tooth can be properly adjusted to it. The tooth can now be attached to the pivot by a small portion of shellac, again tried in, and altered if necessary till the position is satisfactory. If the pivot does not fit too tightly, the whole can be withdrawn together, entirely invested in plaster and asbestos, except the portion on which the solder is to flow, and when dry, the cement is carefully removed, borax applied, and the union strongly soldered.

The piece is now finished up, reducing the shoulder around the pivot to less than half a line in breadth, as a large plate covering the end of the fang would be of no advantage, but would only form a lodgement for foreign matter and the secretions of the mouth, whereby decomposition and consequent destruction of the dentine of the fang would be the result. If the pivot is not retained sufficiently firm in the tube, it may be wrapped with a very few fibres of floss silk or cotton, and when forced into its place with a slight rotary motion, it will remain quite firm, and can be used by the patient with almost as much satisfaction as a natural tooth. If the adjustments have been properly made, the shoulder or flange will fit up closely and rest on the edge of the tube, the neck of the tooth resting on the beveled edge made for its accommodation, thereby preventing the tooth from turning on its axis, and the juncture is hidden by the free margin of the gum.

Artificial teeth attached by this method, if the operation be faithfully performed and the patient take proper care of it after-

wards, may be retained and used with the greatest satisfaction, for many years. They should be removed at least three times a week, the parts thoroughly cleaned, and the pivot, if necessary, wound with new fibres of cotton or floss silk before returning it to its place. Proper care and cleanliness will entirely prevent any recurrence of decay in the fang, and the appliance is far more permanent and less inconvenient than any other kind of dental substitute.

The principle, as above described, can only be used in attaching artificial crowns to the six anterior upper teeth, and perhaps the lower cuspids: the fangs of the lower incisors being too much compressed to permit the introduction of a tube of sufficient size.

The molars and bicuspids, however, may be accommodated by a modification of the process, using two or three smaller tubes instead of one, with corresponding pivots soldered to the gold base to which the teeth are attached. But the better way of treating these teeth, especially the molars, where an artificial crown is called for, is to adopt a plan suggested by Dr. Maynard of Washington City. This consists in making a crown of solid gold, or of porcelain, and attaching it to the previously prepared base by means of screws, and then filling around the juncture a ring with adhesive gold, or common gold foil, thereby excluding the secretions of the mouth, and making a much easier and more perfect operation than by building on an entire crown with adhesive gold.

The root or base should present all healthy indications before enumerated in the case of incisors, and each fang should be thoroughly and carefully filled, together with the pulp cavity, or as much of it as is left, and the whole base is then made smooth and polished. Then with a proper instrument a small shallow groove is cut around the margin of the base to retain the filling: it is then ready for the attachment of the crown.

A model of wax should be made, fitting the basement already prepared, properly articulated with the tooth above, and of the desired shape of the crown attached. From this model is made a mould or matrix of fine sand and plaster, and, after thoroughly drying, the gold may be poured in in a melted state from the crucible, the mould having been previously warmed. This may now

be finished up and polished, and two or three holes drilled vertically through it so as to come on to the most solid portions of dentine in the base. These are deeply countersunk at the coronal aperture, to give place for the heads of the screws. A similar crown may be carved of porcelain, so as to represent the natural tooth, having the apertures for screws drilled through before baking. Or merely a buccal surface might be made by the manufacturers, furnished with platinum pins, by which it could be soldered to the gold crown, where the operation would be likely to be exposed to view in the mouth.

The crown, whether of gold or porcelain, is now placed on the base, which it should fit accurately, and the places for the screws marked and the holes drilled. Gold screws are made of the proper length, and with a tap, threads are cut in the base for the accommodation of each screw. A small groove and undercut is made with a graver around the periphery of the base of the crown, corresponding to the one made in the base itself, for the retention of the gold filling.

All the parts are now thoroughly dried, and having all the requisite appliances for completing the operation at hand, the crown is securely screwed to the base, and the groove at the juncture carefully filled with gold foil; also filling over the heads of the screws as in common crown cavities, thereby excluding entirely all foreign matter or buccal secretions. The surfaces of the fillings are now finished, and the whole operation completed.

These operations necessarily require a considerable amount of patience and skill in their performance: but there are many cases in which they are called for either by the necessity or preference of the patient, and whatever can be done by the dentist towards the preservation or restoration of the natural teeth, without encumbering the mouth with plates, clasps, &c., should be considered the highest productions of his professional skill. And where a very useful organ can be restored to do good service by such means, they should not be considered "fancy operations" but the utmost resources of scientific knowledge: and mechanical skill should be brought into requisition, to produce results *as near perfection as possible.*

(From the Richmond and Louisville Medical Journal.)

ENCEPHALOID TUMOUR OF ANTRUM—REMOVAL OF SUPERIOR MAXILLARY—RECOVERY.

By Donald Maclean, M.D., L.R.C.L., Edinburg. Professor of Surgery and Clinical Surgery in the Louisville Medical College.

Case.—J. W., from Casey county, Ky., æt. 54, married, was introduced to me April 1st, by Dr. Coleman Rogers. Complained of a tumor on the left side of the face, and of which he gave the following brief history: Eighteen months ago, patient noticed that his left nostril was somewhat obstructed: had no pain in the face, but a slight sensation of fullness. Obstruction of the nostril soon became complete, and slight swelling appeared on that side of the nose. General health good. Medical advice was obtained, and various external applications made without effect. Within the last three months the swelling has increased, especially towards the mouth, and there is now a good deal of deep, gnawing pain all over that side of the face. On examination, the left antrum was found completely filled by a soft, pulpy mass, evidently encephaloid. The anterior wall of the antrum and the hard palate on the left side have both been absorbed, so that the tumor lies immediately beneath the skin of the face and the mucous membrane of the roof of the mouth, adherent to the latter, but fortunately not to the former. The tumor does not appear to involve any other of the bones of the face or cranium. I informed the patient truly as to the progressive and destructive nature of the disease: the advisability of its immediate extirpation, the excellent prospect of rapid recovery from the operation, and, with no less distinctness, the chances of adverse ulterior contingencies. He at once determined to return, as soon as he had arranged some private matters at home, and submit to the operation; accordingly he again called on me on the 11th of April. In the interval, the tumor was found to have made very considerable progress. The swelling had extended outwards on the face, (i. e., towards the malar bone) and the mouth was considerably fuller. The patient was fully conscious of the progress in these

directions, and he complained of more constant and acute pain. Otherwise his health was good. On the 13th, assisted by Drs. Octerlony and Coleman Rogers, and Mr. G. Herchmer, I performed the operation as follows, chloroform having been fully administered by Dr. Octerlony: The first incision extended from the inner angle of the eye, down to the mouth at the middle of the upper lip; from the upper end of this a second was carried outwards along the lower margin of the orbit to the maxillary process of the malar bone. The flap thus formed was reflected, and several enlarged arteries tied as soon as divided, and pressure employed to check the copious hæmorrhage from the general surface of the tumor. The eye and subjacent tissues were carefully dissected from the orbital plate, the mucous membrane of the roof of the mouth divided throughout its whole extent, the bone isolated by sawing and nipping through with the bone pliers; the alveolar, palate, nasal and malar processes, and the pulpy mass, without any difficulty (except what result from its want of cohesion) wrenched out. No vessels were tied in the cavity. The most careful examination convinced all present, viz: besides the gentlemen before mentioned, Drs. Lewis Rogers, Brandeis, Logan, Satterwhite and Turner Anderson, that the whole of the diseased tissue was removed. The cavity was stuffed with lint soaked in a solution of carbolic acid, and the edges of the wound drawn accurately together with silver sutures. The progress of the case after the operation was as satisfactory as could possibly be desired. The wound healed by the first intention. The cavity soon commenced granulating, with every appearance of healthy action. The functions of deglutition and articulation, at first somewhat impaired, were in the course of the first week as fully restored as could be expected under the circumstances. The patient slept and ate well without medicine of any kind: indeed, it may be worth while to mention here that, except a mercurial purge, the day before the operation, one dose of McMunn's elixir immediately after, and one dose of castor oil on the third day after the operation, no medication whatever was resorted to, and this notwithstanding that erysipelas appeared on the face on the fourth day. This complication was just permitted to run its course, as

it would have done, even in the face of the most strenuous efforts to arrest it: and at the end of a week it had disappeared, after having passed all over the head and neck, without, however, causing serious inconvenience. On the eleventh day after the operation the patient returned to his home, a distance of more than 100 miles, and on the 31st of April I received a note from him, dated on the 30th, in which he says, "I have improved every day from the time I left you, and am now in fine spirits."

The structure of the tumor, when submitted to microscopic examination, was found to vindicate the opinion which had been confidently expressed, as to its malignant nature.

PROTRUDED SUPERIOR MAXILLARIES.

By O. Wilson, D.D.S.

Shall we apply pressure, thus inducing absorption—try to adapt curved gum teeth to this protrusion, as one would try to look around a corner.—or shall we put up a set of plain teeth, letting the base of the front teeth rest upon the gum. These are questions that urge themselves upon us for decision when such cases are presented to be supplied with artificial teeth.

In conversation, lately, with a dentist of considerable celebrity, he stated his plan generally to be, putting up a set of teeth in the usual manner, but paring off the model considerably at the points of too great fullness, which causes the plate to press heavily upon these points.—with proper explanation and instructions to wear it constantly, sends the patient away. At first the adaptation of the plate is not good, and there is an uneasiness amounting at times to positive pain. In a day or two the patient returns complaining of these unpleasant results;—Well, Madam, says the dentist, I told you what must be endured: now you must not come here to scold and bother me: go home and endure it patiently for a short time, and your plate will be all right.—In extreme cases 'tis well to adapt the plate in this manner, and allow it to be worn a few days without the teeth, when it may be re-adapted.

This is one of the best plans to reduce the size of the alveolar process, provided we can induce our patients to submit to it. Ours are refractory and ease-loving, and no appeal to their pride, next to pain the most powerful persuader we can think of, has any effect to drive them, except it be to drive them away to some more fortunate dentist, whose very *look* is authority.

One case came to our office, in which the upper jaw protruded five-eighths of an inch.

Here was trouble. The back teeth were destroyed by decay. We urged the retention of the front ones, which were fair, and counseled resignation: but subsequent visits demonstrated that the patient would not be *resigned* to this disfiguration. Complained of pain all along the region of protrusion, and said the teeth must be extracted. We suspect the teeth hurt about where the darkie's *too coarse* boots hurt him—"at the stomach."

Encouraged by a successfully performed similar operation by some gentleman in St. Louis, we thought to lay bare the process and cut its extra fullness off. But apprehensive that the jaw was still pushing forward and outward, we decided, after removing the teeth, to adopt the first above mentioned plan minus the teeth, hoping thus to produce sufficient absorption, if not by pressure of the lips and handkerchief used to hide it, which at present bids fair to become potent.

In two instances, not *quite* so extreme, we have succeeded admirably by resorting to the plain teeth, allowing the ends to press *firmly* against the membrane, and well *under* the protrusion: as the prominent natural gum does not appear so unpleasant as we imagined.

In protrusion of the upper maxillary, the usually accompanying thin and scant lips make it desirable that not even rubber be permitted to go above the front teeth, as, if the lips do not appear puffed, the artistic effect is not good.

Back of the front teeth it is very desirable that the rubber go above the molars, as usual. In packing, if English pink rubber be placed between the teeth at those points liable to show, the *contrast* between the natural and artificial is not so apparent: but we would not extend it to portions requiring great strength.

Mechanical and Miscellaneous Department.

GOLD SOLDER.

In the manipulation of gold for dental purposes, there is no greater source of annoyance than the use of poor solder. Our best efforts at fine work are often defeated by the use of solder that does not flow readily at a given degree of heat. Formulas for solders of different degrees of fineness are to be found in our text books, and many others have from time to time been given to the profession through the medium of our dental journals, yet it seems a difficult matter to obtain, with any degree of certainty, an alloy which will flow readily at a given degree of heat, and at the same time possess other qualities desirable in a metal to be worn in the mouth. In this age of rubber work, but few operators pay enough attention to the manipulation of gold and other metals to enable them to make a solder from the formulas given, which will be what is desired; hence our dental depots are depended upon to furnish an article that every dentist should make for himself, not only as a matter of convenience, but that he may know the quality of the solder he is using.

For the benefit of those of our readers who feel any interest in this department, we herewith publish several formulas for solder, with a few suggestions on the process of combining them.

No. 1 Solder, 19½ Carats:

1 dwt.	0 grs.	22 carat gold.
	2 "	pure silver.
	1 "	roset copper.

No. 2 Solder, 16 Carats:

1 dwt.	0 grs.	18 carat gold,
	2 "	pure silver,
	1 "	roset copper.

No. 3 Solder, 16 Carats:

3 dwts.	0 grs.	pure gold,
2 "	0 "	roset copper,
1 "	0 "	fine silver.—*Harris.*

No. 4 Solder, 15 Carats:

6 dwts. 0 grs.	22 carat gold,
1 " 6 "	silver,
20 "	copper,
19 "	brass.—*Richardson*, Mechanical Dent'ry

No. 5 Solder, 18 Carats:

1 dwt. 6 grs.	22 carat gold,
4 "	silver,
1 "	copper,
1 "	brass.—*Richardson*, Mechanical Dent'ry.

No. 6 Solder, 16 Carats:

1 dwt. 0 grs.	22 carat gold,
3 "	copper,
3 "	silver,
2 "	zinc.

No. 7 Solder, 18½ Carats:

1 dwt. 0 grs.	20 carat gold,
2 "	pure cadmium.

In combining metals like gold, silver and copper, which melt at high degrees of heat, little care need be observed in conducting the heat or the melting of the metals to insure uniform results. The metals should be pure and clean, free from any dirt or oxide, which are liable to make the ingot brittle. If 22 or any other carat gold is used as one of the components of a solder, none but such as will work well into plate, should be used. Select a clean crucible, one no larger than is necessary; the second size or next to the smallest in the nest, being large enough for any amount up to 3 ounces. A larger crucible exposes too much surface for oxidation, a result we should guard against in making solder. Placing the gold and copper in the crucible, with a little borax or other flux to protect it from oxidation, cover it to exclude the air, and place it in the fire. The fire should be made of clean charcoal or coke; especially should it be free from particles of zinc, tin or lead, with which the former, in the dental laboratory, is liable to be contaminated. The gases generated by the burning of these metals, if permitted to come in contact with the molten mass, will be absorbed, and render the ingot hard and brittle. When the gold and copper are thoroughly melted, remove the cover from the crucible and add the silver in small quantities, not large enough to chill the mass. When the silver is all added cover the crucible and raise the heat for 3 or 4 min-

utes, to mix the metals before pouring. It will sometimes be observed that the ingot is not properly alloyed, or that the metals were not thoroughly incorporated, there being more copper in some portions of the ingot than others: when this is the case, a second melting will be necessary.

To thoroughly incorporate the mass, some metallurgists recommend the pouring of the metal through a sieve, allowing it to drop into water, thus minutely dividing it, which is then gathered up and remelted, and cast into ingots. This, however, is generally unnecessary if proper care has been observed in the successive steps of the process. When 22 carat gold is used, that is, gold alloyed with any portion of silver, it is better to melt the copper first, then add the gold previously alloyed with silver. This precaution is necessary to avoid loss of the silver by oxidation.

The most popular solders of the present day contain a quantity of zinc, which is added singly or combined with copper in the form of brass. One of the greatest objections to this form of solder is the uncertainty of the result. The union, in definite proportions, of two or more metals, as gold or copper with zinc, the one melting at a very high degree, the other at a low temperature, is exceedingly difficult. The high degree of heat required to melt the one, oxidizes rapidly the other, and the consequent loss changes materially the proportion.

On this account much more care is to be observed in the making of this class of solders. Every precaution possible should be taken to prevent oxidation. The gold, silver and copper should be first melted and the zinc then added in small quantities, plunging it into the surface of the molten mass. When the zinc is all added cover the crucible, and heat up till sufficiently fluid to flow. The mass should only be hot enough to be in a pasty condition when the zinc is added: if hotter than this, most of the zinc will be lost. The surface of the mass should be well covered with flux of borax and saltpetre to gather up the oxide of the zinc, otherwise the ingot will be light colored and brittle. With all the care that can be taken, about one-third of the zinc will be lost in the making of any solder containing it.

There is less loss when added in the form of brass, or when first combined with the silver.

In making solder No. 7, containing cadmium, the same care must be observed to secure satisfactory results, as cadmium is rapidly oxidized by heat. Its loss will be found to be fully as great as that of zinc, but it does not affect the malleability and tenacity of the solder as much as the zinc. Solder made after this formula will be found of good color, tough, and will not change color on being worn in the mouth. Either of the above solders may be made in small quantities on a charcoal mat, with the blow pipe flame. In making Nos. 6 and 7 in this manner, the gold, silver and copper should be first melted and run into a lump, and while hot removed and the zinc or cadmium placed underneath it. The flame is then thrown cautiously upon the lump until it begins to soften; the heat may then be raised until the metals are thoroughly united. The proportion of zinc or cadmium should be increased a little when the solders containing them are made in small quantities. E.

SETTING NATURAL TEETH ON A METALLIC PLATE.

We are sometimes called to extract a front tooth, an incisor or canine, which has become loose and sore from disease, and the consequent loss of the process immediately surrounding it. Such cases have generally to be supplied with an artificial substitute. When the tooth extracted is sound, which is often the case, I have in several instances made use of the natural crown with highly satisfactory results, in the following manner: Adapting a gold plate as for an artificial crown, I cut off three-fourths of the root of the tooth extracted, and enlarge the nerve canal by drilling it out with an ordinary square drill as large as the tooth will admit of. A gold tube is then made of heavy gold plate, say No. 20, Stubb's gauge, large enough to fit closely the hole in the crown, and a screw cut on the outside. With a small square file dress out the inside of the tube to a square, and fit into it accurately the dowel which is to be used to attach the

tooth to the plate. The dowel is made of what is known as clasp stuff, an alloy of gold and platinum. A strip two inches long, as wide as the square in the tube and one-half as thick, is doubled, forming a square bar the size of the inside of the tube, to which the *open end* is fitted.

One end of the tube is closed, and it is screwed into the crown. Placing the plate in the mouth, the crown is adapted to its position as an artificial crown is fitted. A little wax is placed on the lingual surface of the plate, immediately under the base of the tooth, which is then placed in position and pressed down upon the wax, which indicates the position the dowel is to occupy. A hole is made in the plate at this point; the plate is returned to its position in the mouth, the crown adjusted and retained in position on the plate by the use of a little gutta percha or plaster. The whole is now taken from the mouth, and the dowel passed through the hole in the plate well up into the tube, and retained there by covering the protruding portion with shellac or plaster. The crown is now removed, and the lingual surface of the plate and dowel covered with an investment of plaster and sand. When sufficiently hard, the plaster and shellac is removed from the palatine surface and the dowel soldered fast, care being taken to prevent the solder running down and uniting the two halves. The protruding portion of the dowel on the palatine surface of the plate is now cut off, and the plate finished up and polished. The sides of the dowel are separated slightly, the crown put on, and the case is complete. E.

METALLIC DIES.

By A. E. Matteson.

To obtain a metallic die direct from the impression without making use of the slitted impression cup, as patented by Messrs. Stuck & Owen:

Take the impression in the usual manner with plaster. When sufficiently hard remove it from the cup, and pare from the lower or outer surface, leaving it from 1-8 to 1-16 of an inch in thick-

ness; build up the edges and across the back of the arch with plaster; dry thoroughly, and while hot fill with the melted metal (tin); if it blubbers, pour back, as the impression is not thoroughly dry; two or three times pouring will dry the plaster if not dry at first. Construct the plate on the die thus obtained, using sheet tin for trial plate, &c., as suggested in the January number of the *Missouri Dental Journal*, pp. 31 and 32.

AMERICAN DENTAL ASSOCIATION.

The Ninth Annual Meeting of the American Dental Association was held in Union Hall, Saratoga Springs, N. Y., commencing August 3d, at 10 A. M.

The following named gentlemen were elected to fill the offices of the Association for the ensuing year:

President—Homer Judd, St. Louis, Mo.

First Vice-President—S. J. Cobb, Nashville, Tenn.

Second Vice-President—C. E. Francis, New York.

Corresponding Secretary—I. A. Salmon, Boston.

Recording Secretary—M. S. Dean, Chicago.

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Instruments and Appliances—Frank Abbott, A. M. Holmes, J. B. Morrison.

Publication—E. A. Bogue, J. Taft, and the Secretary.

Nashville, Tenn., was selected as the place of holding the next annual meeting, commencing August 2d, 1870, at 10 A. M.

IOWA STATE DENTAL SOCIETY.

The seventh annual meeting of this Association was held at Muscatine on the 20th, 21st and 22d days of July. There was a much larger attendance than usual. Many of the members came long distances, and exhibited a zeal in the good work of mutual instruction which these meetings afford, worthy of all commendation. Several of the old and constant members said they *always* returned home well paid, both in the new ideas received, and the pleasure of such annual reunions.

The sessions were held in the spacious and pleasant office of Dr. Kulp.

The members partook of an elegant and tasteful dinner at the house of Dr. Hardman. An evening entertainment was given at the residence of Dr. Kulp, consisting of delicious ices, &c., together with vocal and instrumental music of high order. With speeches and toasts time slipped away into the smallest hours before the company separated.

The society voted to publish their proceedings as a supplement to the MISSOURI DENTAL JOURNAL. C.

USE OF GUN-COTTON IN DENTISTRY.

This statement appears absurd at first, as if dentists used gun-cotton as an explosive agent; but the fact is, that quite recently the collodion made of gun-cotton, hardened by evaporation, as a

varnish, into thin sheets, has been used as a substitute for the objectionable vulcanized rubber, as a basis for support of false sets of teeth. For this purpose different sheets are softened by ether, and pressed together in the mould, which is made in a way similar to that in use for making the platinum or India-rubber sets.

One of the objections to the vulcanized rubber sets of teeth is the dark color, which can only be corrected by vermillion, which gives it a reddish color, somewhat similiar to that of the gums. Vermillion, however, being a compound of mercury, seriously affects the health of some persons, whose peculiar constitution renders them very sensitive to the influences of this pernicious metal.

In drying, collodion contracts considerably, and the only additional trouble, in making objects of dry collodion, is to make the moulds larger, by repeated castings and recastings in plaster; the plaster expanding every time a little, the last mould obtained may be sufficiently enlarged to compensate for the shrinkage of the material. Sets of teeth made on collodion are much lighter and stronger than on any other material thus far employed for that purpose, and, no doubt, will soon come into general use in the United States, as the dentists of this country are among the most progressive in the world.

TO RENOVATE CORUNDUM WHEELS.

These wheels often become glazed over and refuse to cut. Dr. Corcoran, of this city, tells me that by *brushing* them with *alcohol* they become as good as new. C.

ZINC CEMENT FOR TEETH.

Finely powdered white sand 4 parts, and fresh white oxyd of zinc 12 parts, are mixed together and kept in bottles with well-fitting stoppers. When required for use, 4 parts of this mixture are rapidly mixed with a solution of one part of powdered borax in 2 of hot water and 50 of a highly concentrated solution of chloride of zinc.—*Druggist's Circular.*

The Missouri Dental Journal.

A MONTHLY RECORD OF THE SCIENCE.

VOL. I.] SEPTEMBER, 1869. [No. 9.

THE INTERIOR OF THE EARTH.

From the Boston Journal of Chemistry.

We all feel a natural curiosity to know what is inside of this round ball we live upon, and to the scientific man the inquiry is one of peculiar interest. Many investigations have been made with a view to settling the question, and many speculations and theories have been the result. The most important of these theories will form the theme of this familiar chat with our readers.

It must be borne in mind from the outset, that the examination of the structure of our globe is necessarily of a very *superficial* character, in the most literal sense of the word. The distance to which we can penetrate the earth is even more insignificant than it seems at first thought. If we represent the earth by an ordinary 12-inch terrestrial globe, the greatest depth to which all natural cavities and artificial borings and minings extend would be shown by a delicate scratch made by the point of a pin on the varnish. If the scratch were more than the *hundreth of an inch* deep, it would be an exaggeration of the reality. We need not wonder, then, that scientific men differ widely in their theories concerning the interior of the big ball whose surface has been scratched so slightly by their most extended explorations.

These theories, setting aside many wild speculations which have no scientific basis to rest upon, are mainly the four following:

First. That the earth consists of a relatively thin crust, filled with molten matter.

Second. That it is nearly or quite solid to the core.

Third. That it has a solid shell and a solid core, with a zone of molten matter between.

Fourth. That it is a solid shell, filled with gaseous matter enormously compressed.

We will take up these theories in turn, stating as briefly and simply as possible the leading arguments which have been urged for and against each of them.

In favor of the first theory—that the earth is a solid shell enclosing a molten mass—we have the following facts:

1. The temperature of the earth is found to increase as we go down beneath its surface. This increase varies somewhat in different localities, ranging between one and two degrees Fahrenheit for every one hundred feet. At this rate of increase, the temperature at a depth of forty or fifty miles would be sufficient to melt every known substance.

2. Hot springs and artesian wells prove the same increase of heat as we descend into the earth. At Paris, the water from the depth of 1,800 feet has a temperature of 82°; at Salzworth, in Germany, from a depth of about 2,150 feet, 91°; a hot spring in Arkansas has a temperature of 180°; and many similar instances might be quoted.

3. Volcanic phenomena, and especially the pouring forth of streams of lava, which are simply molten rock, are additional proofs of the intense heat which must prevail at great depths.

4. The fact that all lavas have essentially the same composition indicates that they probably come from one source, and are not *local* in their origin.

5. There are evidences of volcanic action on a most extensive scale in former geological ages.

6. The elevation and depression of great areas of the surface of the globe indicate that the crust cannot rest upon an unyielding foundation, but that when one part goes down another goes up. The solid earth is not so solid as it seems, but is slowly heaving up and down in enormous waves. The "everlasting hills" themselves are only ripples of this world-wide undulation, and even now are rising and falling with the lapse of centuries.

The reasons for the second theory—that the earth is solid to its centre—are purely astronomical.

Experiments made with two pendulums of the same length, one solid and the other a hollow glass ball filled with mercury, show that the latter swings faster. This fact led Prof. Hopkins, of Cambridge (England), to make a series of elaborate mathematical calculations, by which he proved, or *thought* he proved, that certain motions of the earth (known to astronomers as *precession*, *nutation*, etc.) would not be just what they are if the earth were a hollow ball filled with liquid.

It might have been seen, at the outset, that the ball of polished glass, filled with the slippery and mobile mercury was not exactly like the earth ball, with its rough and jagged shell filled with a liquid like molten lava: but this does not appear to have occurred to Hopkins and those who adopted his views. But last summer Delaunay, an eminent astronomer and mathematician, re-examined the problem, showed the fallacy of the premises, and reversed the decision; and also proved *experimentally* that the two spheres—one solid, and the other filled with melted matter—would behave exactly alike.

The astronomical objections to the first theory were thus removed, but these are not the only ones which have been brought forward. In 1849, Thompson asserted, on theoretical grounds, that the melting-point of bodies must rise *under great pressure*: and, in 1854, Hopkins and Bunsen proved this experimentally in the case of certain substances, as spermaceti, wax and sulphur. Hence they inferred that the enormous pressure to which the matter deep down in the earth would be subjected, on account of the weight resting upon it, would render it impossible for it to be melted, even if the temperature were as great as it had been assumed to be.

But further experiments showed that, while the melting-point rises under pressure *up to a certain point*, it then *falls*; so that the matter at great depths, instead of being *less* fusible on account of the superincumbent weight, would be *more* fusible than at the surface. Moreover, experiments on metallic substances gave wholly different results from those obtained with wax, sulphur,

etc.; and, in 1861, Fairbairn proved conclusively, by experiments on much greater pressures than had been tried by Hopkins and Bunsen, that "it is only in the more compressible substances that the law holds true."

If the earth is solid, volcanoes must have a local origin: but, as we have said above, the fact that lava in all parts of the earth is essentially the same compound is against this view. Moreover, recent researches appear to show a *tidal* character in the eruptions of Vesuvius, which would be inconsistent with the theory that their cause is a merely local one.

The third view—that the earth has a solid shell and a solid core, with liquid matter between the two—makes our globe a sort of "gigantic egg." It is a compromise between the first and second theories, and like most compromises, is not at all satisfactory. It was based on the views of Bunsen and Hopkins, which have been already mentioned: and these, as we have explained, have been completely overthrown by the investigations of Delaunay and others.

The fourth view—that the earth is a shell filled with gases enormously compressed—is based on purely theoretical grounds. The earth has been *weighed* by several different methods, which it would take too long to explain here, and its mean density is found to be about five and a half times that of water: in other words the earth weighs about five and a half times as much as a globe of water of the same size, or some eight thousand miles in diameter. Now it is argued that, if the interior of the earth were either solid or liquid, and were made up of such substances as we find near the surface, the *condensation by pressure* would inevitably give a greater mean density than five and a half.

But this depends entirely on the assumption that density increases in *direct* ratio to pressure. If this were the case, air, at the depth of eighty miles, would become as dense as water: while water, three hundred and sixty miles down, would have the density of mercury: and clay, which at the surface weighs one hundred and twenty-five pounds the cubic foot, would weigh six *tons* the cubic foot. Hence it is contended that the central mass

may consist of gases, which under such enormous pressure could not become more dense than five and a half.

Experiments, however, do not show such unlimited rate of condensation under pressure. It used to be thought that the immense pressure at great depths in the sea would squeeze everything solid, and render all animal life impossible: but deep-sea soundings show that, even at the depth of several miles, there are slimy deposits replete with varied forms of animal life.

Again, there are few gases that can bear a very great pressure without becoming liquid or solid. Under such enormous pressure as this theory assumes to exist deep down in the earth, it is probable that every known gas would be liquefied.

We have given only an outline of the arguments brought to sustain or demolish these various theories, for our limits permit us to do no more. It will be seen that, on the whole, the balance of argument seems to be in favor of the first and the older theory, that we live on a thin shell, separating us from a heaving sea of liquid fire, of which volcanoes are merely the safety-valves. This theory, moreover, is in harmony with the nebular hypothesis of Laplace, which we have briefly described in a former article (February, 1868), and which is now almost universally accepted as the most simple and satisfactory explanation of the origin and development of our whole solar and stellar system, which can be devised in the present state of our knowledge.

From the St. Louis Medical and Surgical Journal.

CHLORAL—A NEW ANÆSTHETIC.

Being at present engaged in the chemical laboratory attached to Virchow's Pathological Institute, it is with particular pleasure that I communicate to you an important discovery for which we are indebted to its chief, Dr. LIEBREICH.

Though Dr. L. has laid his discovery before the scientific men of Berlin, in both the Chemical and Medical Societies, nothing has as yet appeared in print, and the hasty account cannot but

be exceedingly unsatisfactory, yet I trust it will not be without interest, as being the first which crosses the Atlantic.

The researches of Dr. LIEBREICH have disclosed a new, and to all appearance, most valuable anæsthetic, which bids fair to rank with chloroform and morphine as one of the benefactors of suffering humanity.

Chloral (C_2Cl_3OH), the aldehyde of trichloretted acetic acid, has indeed been known to chemists for perhaps the last thirty years, but its valuable medicinal properties have so far been utterly overlooked. It is a colorless fluid of penetrating odor, but almost without taste, obtained by the action of chlorine gas upon alcohol, and is thus prepared in England on a large scale, being used for the manufacture of chloroform, a solution of caustic soda decomposes it, with production of chloroform and formate of soda $\begin{matrix}CCl_3\\COH\end{matrix}\Big\}\ddot{O}\quad\begin{matrix}H\\Na\end{matrix}\Big\}O = CCl_3H\quad\begin{matrix}COH\\Na\end{matrix}\Big\}O$. Upon this process, the gradual decomposition of the soluble and readily absorbed chloral in the alkaline fluids of the body—this slow production of chloroform,—probably depend its effects upon the system.

We may compare the action of chloral to that of chloroform inhaled in small, continued doses: in some cases a slight headache followed, apparently less than is produced by morphine. Little can, of course, as yet be said from the few cases on record, though it has been given internally with success to patients in different departments of the Charité. A solution of the hydrate in an equal quantity of water has been used—the largest quantity as yet given has been 4 grammes. 4 grammes of the solution contain 2 grammes (32 grains) of the hydrate, and decomposed give $1\frac{1}{3}$ grammes, about 21 grains, of chloroform.

Upon animals the injection has been used with most satisfactory results: drowsiness comes on, and soon perfect stupor. The effect is mild and gradual, not the least sign of a *stadium excitatorium*, so disagreeable in chloroform. This death-like stupor was prolonged, according to the strength of the dose, as far as 18 hours; upon awakening, the animal appears in full possession of his faculties, and at once feeds.

This anæsthetic is applicable, it would appear, in cases of insomnia from general suffering, mental excitement, and even in cases of insanity, where it has already been successfully tested. Though it cannot be expected to supersede either chloroform or morphine, differing from both in its effects; we may confidently predict for it a wide and important field of action, and American physicians will certainly not be behindhand in giving chloral a fair test.

So much, until I shall be enabled to send you Dr. L.'s publication.

Respectfully,

GEO. J. ENGELMANN, Stud. Med.

From the Boston Medical and Surgical Journal.

ON THE IMPORTANCE OF THE STUDY OF PHYSICAL SCIENCE IN MEDICAL SCIENCE.

An Address delivered at St. Mary's Hospital, May 22, 1869, by WM. ROBERT GROVE, Esq., Q.C., F.R.S.

When the honor of presiding at this meeting was proposed to me on the ground that, having devoted some time and thought to physical science, I might with effect urge its importance for medical education, the task seemed an easy one: and, in a weak moment, I yielded to the temptation. On thinking the matter over, however, I found, too late for escape, though not for repentance, that the axiomatic truth of the thesis on which I was to discourse formed its great difficulty. Euclid could not prove that things which are equal to the same thing are equal to one another in any other way than by stating the proposition. How is one to urge the importance of a branch of study in aid of that profession which depends entirely on that branch of study? Medicine without chemistry and physiology, surgery without anatomy and mechanics, would indeed be the play of *Hamlet* with the part of Hamlet omitted. I must, therefore, take another starting-point; and, assuming that all connected with these schools are as fully convinced as I am that the study of physical science is the basis of medical education, I must rather address

myself to those without, and endeavor to show what the healing art would be without science.

The following anecdote, in Faraday's own words, furnished to me by my friend Dr. Bence Jones, will not be a bad illustration:—

"July 24th, 1819, Machynlleth, Merionethshire.—I wanted a little alcohol; and, having found out a doctor's shop and a spruce doctor's man, got some. I then asked for a little spirits of salts, hoping I could have it in a glass stoppered bottle.

The man found me a bottle, having emptied one of his preparations out of it, and would then have poured in acid; but it was not the acid that I wanted, and I again mentioned spirits of salts to him, willing to allow everything to the possibility of his ignorance of the scientific name, but at the same time adding, "muriatic acid,' to save his credit, if possible. He now seemed to understand me; and, reaching down another bottle, again prepared to pour, but I stopped him. 'It is muriatic acid that I want.' 'This is muriatic acid, sir.' 'No, that is nitric acid.' 'They are the same, sir.' 'Oh, no; there is a little difference between them, and one will not do for me as well as the other.' I then endeavored to explain that the one came from nitre; the other from common table salt. He comprehended a difference between these two bodies, but not between their acids; and he brought out a *Pharmacopœia*, and, opening it at Muriatic Acid, uttered the Latin name and synonyms fluently and with great emphasis, endeavoring thus to prove to me the two were alike. I was really ashamed to correct the doctor; and, if I had not been under the necessity of vindicating my contradiction of him, should have left him in ignorance. However, at last I made him comprehend, from his own book, there was something like a difference between these acids; but I don't think he shut the book much improved by the affair. I could scarcely afterwards look at the man. If he had any feeling—he appeared to have a considerable stock of pride—he must have felt himself extremely lowered in the eyes of strangers, and before his own companion, who was standing by. I began to rummage his bottles for muriatic acid myself; but I must do him the justice to say he first found out

what little they had (about an ounce), and that he really compared it with the nitric acid—I hope for information, though the object professedly was to show me how like they were. Is it not strange that a man so ignorant of his profession should still appear respectable in it; or that one so incompetent should be entrusted with the health and lives of his fellow creatures? Had I seen nothing more than his harshly dictatorial manner to a poor woman who came in with a prescription and a bottle in her hand, I should have concluded him to be a man who had attained the utmost knowledge of, and confidence in, his art. Seeing what I did, I cannot enough condemn the being who, without a knowledge even of the first requisites of an honorable but dangerous profession, assumed to himself its credit and its power, and dashed at once upon human life with all the means of destruction about him, and the most perfect ignorance of their force."

Another instance of the dangers of ignorance occurred to myself twenty-five years ago. Suffering from an illness for which strong doses of opium were required, I obtained a prescription which concluded with the words "quartâ quâque horâ sumendum." Fortunately for me, though perhaps not for you, I read it: for when the bottle came it was labelled, "To be taken every quarter of an hour," which direction would have given me sixteen times the prescribed quantity; and had I followed it, you would have been spared the trouble of listening to me to-day. Another not uncommon mistake arising from ignorance of chemistry was that, in prescriptions of two or more substances, each of which singly was known to produce a certain effect on the human body, the practitioner considered that by mixing them he would get the effect of each; whereas, if even a slight chemical change took place on admixture, the resulting compound or precipitate produced a totally different effect from any of the components, and was, consequently, injurious, if not fatal.

If there be one species of cant more detestable than another, it is that which eulogizes what is called the practical man as contra-distinguished from the scientific. If by practical man is meant one who, having his mind well stored with scientific and general information, has his knowledge chastened, and his theo-

retic temerity subdued, by varied experience, nothing can be better; but if, as is commonly meant by the phrase, a practical man means one whose knowledge is only derived from habit or traditional system, such a man has no resource to meet unusual circumstances; such a man has no plasticity; he kills a man according to rule, and consoles himself, like Molière's doctor, by the reflection that a dead man is only a dead man, but a deviation from received practice is an injury to the whole profession.

The anecdotes with which I commenced, though doubtless not applicable to the present day, or to this metropolis, show the frightful power which is wielded by medical men. How many fatal blunders may occur we know not, for those who commit them are generally careful to keep the eleventh commandment, viz.: "Thou shalt not be found out." How much harm, however, must have been done, not by ignorance such as this, but by what I may call accredited ignorance, i. e., by received modes of treatment, which the intelligent practitioner despised, but dared not depart from. The practice has so recently ceased that I can hardly venture to remark on it, by which a medical man was paid only for and in proportion to the quantity of drugs he administered; so that in very many cases—in all, more or less—the most honest practitioner could only support his family by giving sham medicine, or that which would produce no ill effect. Even this was difficult, as I need not tell you that a glass of water does harm if it is not wanted. What injury, again, you now know to have been effected by the blind and almost compulsory following of systems—from the time of the Dogmatists and Empirics to the phlogistic and antiphlogistic doctors, and from them almost to the beginning of the present century—what terrible results must have followed from ignorance of physical science, and of its judicious application to medicine!

Physician, i. e., student of nature; but what is nature? Not a personified existence, as she is apt to be conceived, but simply what is, what we observe, or what we deduce or generalize from observed phenomena. Observation teaches us, when directed to organic beings, that they have an adaptability to circumstances, arising, probably, from long continued adaptation; but the limits

of this adaptability are exceedingly difficult to ascertain. To know when and to what extent changes will benefit, and when it will injure or destroy, requires the highest skill of the experienced and scientific physician. The so-called nature of the hot-house grape, of the domestic cow, differs from that of their wild congeners—they suffer from different diseases, and require different remedies.

What is disease? Speaking crudely, is it anything but too sudden a departure from uniformity of action? The function of the whole or of some part of an organism is rapidly accelerated or impeded; the other organs cannot keep pace with it: the structure becomes changed, because those motions which preserve its form, those secretions which feed it, are out of time with it: and either the destruction of the organism, or the setting up of a *quasi* independent life, ensues. Things have become what they are by slow alterations during ages, and their power of adaptation will not bear sudden changes. What can enable you to detect and to remedy this? First, a knowledge of the function of the body in its healthy state; second, a knowledge of the cause of the derangement. Can you proceed one step in these inquiries without a knowledge—ay, a profound knowledge—of physical science? Could we tell, without a knowledge of chemistry, only attained in the present century, why train-oil is good for the Esquimaux and rice for the oriental? Until a few years back, we did not know that fat, and not lean meat, was the best food for those who undergo great but rather sudden physical exertion: and even now we do not know how much sugar, starch, or fat, and how much nitrogenous food are suitable for given habits; how much lime, how much phosphoric acid, &c., are required; for a man without bones would not succeed, and bones cannot grow out of nothing, or substantially from other elements than their normal constituents. The sportsman's appetite may guide him with tolerable accuracy, but you have to treat the lawyer and statesman, and to tell them how they are to economize their powers under the most trying changes of condition. And your difficulty is the greater that you are not allowed to experiment. If a physician could select, say ten patients laboring under simi-

lar disorders, and apply a different mode of treatment to each, he would greatly promote the science of medicine; but he would, doubtlesss, be sentenced to penal servitude for manslaughter.

Of the two first steps to physical science—observation and experiment—one is, to a very great extent, denied you. How can you supplement it? Very feebly, I own. You have, to some extent, *post-mortem* dissection, and you have comparative anatomy and physiology: but you have little more; you may substitute for experiment, observation of individuals: or, better still, of classes, placed by their necessities under circumscribed conditions. Thus the miner would give you some aid as to what degree of health was compatible with exclusion from light and respiration in an abnormal air: and what diseases are produced by such conditions of existence. The fisherman could assist you as to what are the effects produced by a fish diet, &c. Indeed, there is some scope for individual experiment. Fick and Wislicenus made valuable experiments on themselves in their ascent of the Faulhorn. Regnault made valuable experiments on animals (hardly chargeable, like vivisection, with cruelty), by keeping them in different gases, and supplying them with special food.

Physical science applied to these cases is at present in its infancy; but can any one do anything else? It provokes me to hear classically educated men speak in patronizing terms of the introduction of physical science into general education, such as, "I do not object to physical science; I have no prejudice against it." Why you might as well object to breathing, to eating, to seeing.—*British Medical Journal.*

Operative and Surgical Dentistry.

DIAGNOSIS OF DENTAL DECAY.

I think the operation of examining the teeth for dental decay is more carelessly performed than any other oral operation. I have often seen it done in this way, namely: The operator requests the patient to open the mouth, when he takes a small glass and moves it around so as to see the buccal and lingual surfaces of every tooth, and pronounces upon the condition of the teeth without taking an excavator in his hands. Very many patients have had exposed pulps in cavities that had been overlooked at an examination of only a few months previous.

A dentist is morally, and ought to be legally, responsible for such a result following so careless an examination.

Within a few days I have plugged six cavities for a patient forty years old, which had never been plugged, and which were overlooked by a good operator six months since, who had plugged three or four for this patient and pronounced the remainder *all right.*

And this is not a solitary instance, they are repeated monthly.

In the above case these cavities had been *years* in forming; they were of the brown variety, and certainly had not progressed very rapidly since the *examination.*

A few months ago a young lady called on me for an examination of her teeth. I endeavored to make it thorough. Seventeen cavities were found and so reported to her. Her astonishment was very great, for she had just come from one who had made an examination of her teeth, and reported *four* cavities. In a couple of weeks I had finished operations on her teeth and plugged eighteen cavities.

There are some cases of failure in diagnosis of dental decay, even when one *intends* to be very thorough. First and foremost

is the large size of the excavator used for examination. The diagnosis excavator should be of the very smallest kind, and hatchet shaped. The blade should be exceedingly thin, and the shaft near the blade as slender as possible. This excavator should be made for diagnosis alone, and not for cutting enamel or dentine. It is only by having so exceedingly a small and thin blade, that we can discover some of the enamel fissures. In young persons whose teeth have not been many years erupted, the fissures are not easily seen, as they are not always discolored by decay. It it all important that these fissures should be filled before decay takes place, and the borders of the enamel approximate so closely in some cases that it is only with the thinnest blade of an excavator that the fissure can be detected.

The mouth mirror is another cause of defective diagnosis. One that magnifies two diameters should be used, and not the ordinary natural mirror.

Saliva often obscures slight decay, especially in the fissures of the bicuspids. *Tartar* frequently fills the cavity of decay, and hides it from sight. *Food* does the same.

The first thing to be done then, is to thoroughly cleanse the teeth from tartar, food, and any foreign substances.

A patient may have brushed his teeth before leaving home, and eaten fruit or other lunch since, and although no food may really be seen, yet that which is dissolved often remains at the margin of the gum on the enamel, and may hide disintegration of that substance unless removed.

The writer proceeds in this way to make an examination of the teeth for dental decay, namely:

Have a cup of blood-warm water, a small dental syringe, a delicate, short bladed diagnosis excavator, and a longer one, a magnifying mouth mirror; some delicate bits of spunk, and some larger ones, and orange wood for wedges.

I will first speak of the under teeth. Wipe dry the wisdom tooth with larger bits of spunk, being careful to wipe around the margin of the gums, and particularly the posterior margin; wipe out the crown of the tooth: syringe every portion of the tooth well with warm water: wipe every portion of the tooth again,

and examine it with the mirror and the excavators. The wisdom teeth are very likely to become decayed at the buccal margin of the gum, especially at the posterio-buccal surface.

Look out for the buccal perpendicular fissure in all the molars, as well as the masticating fissures. Examine the second and first molars in the same way, and observe the condition of the cup between the two anterior cusps on the crown. There are often *two* minute points of decay here, not larger in diameter than a pin's point, but penetrating to a considerable depth.

On the triturating surfaces of molars there are sometimes seen brown lines indicating fissure, short and not connected with each other, sound dentos lying between them. The fine excavator may not penetrate one of them to a sufficient depth to indicate anything serious; yet these fissures should each of them be opened enough to remove this decay, and in almost every instance they will require plugging. The fissure running from the lingual edge down towards the centre will usually be found deep when the others are very shallow.

Fissures should be looked for on the grinding surfaces of the bicuspids. When there are none perceptible to the eye either in bicuspids or molars, the small excavator may detect them.

The fissures in bicuspids, when full, are of this shape, ⎽, the concavity looking towards the buccal cusp. The upright arms of the ⎽ will be found to have deep cavities when the horizontal portion is nearly intact. Often the fissures in these teeth are only represented by the upright arms.

Very rarely are any fissures found on the *lingual* walls of the under teeth. They must, however, be thoroughly examined.

The *cuspids* and *incisors* are sometimes decayed at their gingival margins.

The approximal surfaces of all the under teeth must now be examined.

Each tooth must be successively wiped dry on its coronal and approximal surfaces, and the magnifying mirror used.

The practised eye will often detect a slight shade on the enamel near the corono-approximal surface, which surely indicates decay on the approximal surface. It is astonishing how far this

shadow may be cast from the seat of decay. In a case not long since, it led me to a small cavity on the posterior approximal surface of a second upper molar, close to the gum. I cut through the whole length of the crown before I found it, for I could not approach it from the buccal surface owing to the smallness of the oral opening.

It is only when the decay is of the dark variety that it will cast a shadow so far. When the decay is more recent, or of the white variety, a pearly tinge will be seen above the cavity. The latter kind of decay is of the greatest importance to discover, as it progresses more rapidly than any other.

Explorations may now be made *between* the teeth with the excavator, and roughness or softness of surface detected, even if no cavity is found at this time. It is often the case that a peculiar softness of the enamel here indicates extensive caries or necrosis beneath.

In dental necrosis, even if the dentos all remains in situ, and there is no cavity, which is often the case, yet the dead dentos should be removed, and a cavity formed and plugged.

We must look out for a perpendicular fissure, or a corono-gingival fissure on the anterior approximal surface of the under first molar. I think they are oftener the result of mastication than of natural formation.

Where the bicuspids or molars are in contact from corona to radix, they should be wedged apart if there is the least suspicion of decay; for in rapid decay, as is usual in young subjects or weakly women, or those enciente and nursing, caries might go on to a great extent before the next semi-annual examination takes place.

The cuspids are often found decayed on their bicuspid surfaces, not as often on their incisor surfaces, and the under incisors themselves are rarely decayed.

What I have said regarding the under teeth applies generally to the upper ones.

A natural fissure will *very* often be found running from the posterior coronal cup over the palatine ridge of the first molar tooth down near the gingival margin. This fissure divides the

two palatine cusps. There are generally two quite distinct cups on the grinding surface of this tooth, and each are liable to fissures. A ridge of sound dentos runs from the *posterior* buccal cusp to the anterior palatine cusp, and this separates the fissure. The anterior fissure is usually in the shape of an L, one arm of the latter running over the buccal ridge, dividing the two buccal cusps, and proceeding a *short* distance towards gingival margin. This *palatine* fissure is often neglected, if not overlooked, and it ought not so to be.

The upper bicuspids are particularly liable to be naturally defective and decay soon, and ought to be plugged at the earliest possible moment.

They are almost as important to the beauty of the face as the front teeth, and are even more difficult to replace with artificial substitutes.

It is not often that the incisors and cuspids need wedging apart for the purpose of making an *examination*, but it is sometimes the case. A good eye, experienced in this kind of diagnosis, and the mirror will usually be sufficient. But if a *doubt* remains on the mind, separation *must* be resorted to.

Always examine the cup on the palatine surface of the upper incisors; if there is a cup there, a fissure will usually be found. This cup *seems* to be formed by a folding over of the enamel towards the centre of the tooth, and it is very thick and prominent.

Decay may proceed in this fissure to a great extent before it would be readily detected by the eye, and therefore the fissure should always be opened, and plugged if found. C.

One of the most important improvements which have lately been made for the operative dentist is the "O. C. White" head rest. The principles upon which its movements are made are the simplest and most convenient possible, viz: the ball and socket.

Cuts of this "rest" may be seen in most of the Journals. I have used one for several months with the greatest satisfaction. The one which I use is the No. 1, price $35. This is no puff. I paid full price. C.

FILLING TEETH.

By H. Judd, M D.

Continued from page 395.

After having properly prepared the cavity, and effectually guarded against the approach of moisture, the next question to be solved will very naturally relate to the material to be used in filling. We shall dismiss the baser materials resorted to with a few remarks upon amalgams, Hill's stopping and oxy-chloride of zinc. The amalgams are yet very extensively used in this country and much more generally still in Europe. It is the practice of very many operators to make use of amalgam in nearly all cases that present any special difficulties, and, as a consequence of this practice, they debar themselves from the experience that is absolutely necessary to fit them for the performance of these difficult operations. One is strongly tempted to this course since a cavity that would require hours of the most laborious effort to fill well with gold, may be filled with amalgam in a few minutes. That such considerations should not be brought into the account so as to seriously affect our judgment in determining which material to use is evident, for each case should receive the best possible attention at our hands, but that these things do influence thousands in their practice is certain. Without condemning or endorsing in general terms the use of amalgam, we will give somewhat in detail what we conceive to be a few facts relating to this subject. It is not necessary to do more than state that this, in common with nearly all the other materials used for this purpose, will in many cases protect the cavity from farther decay. In large cavities, however, in teeth that are somewhat brittle, the margins of the cavities are much more liable to crumble off than they are when filled with gold, thus giving rise to subsequent decomposition. And in many cases when the caries has nearly reached the pulp cavity, we are satisfied that the pulp is subsequently more apt to take on inflammatory action than when gold is used. This may be accounted for by supposing that the oxidation which in

many cases undoubtedly takes place upon the surface of the plug, and not only upon that surface which is exposed to the secretions of the mouth, but also that which is in contact with the walls of the cavity, produces a substance which penetrates the dentine and produces an irritation upon the sensitive structures of the pulp. I have seen cases where the teeth were soft, in which the whole mass of tooth substance, from the apex of the root to the grinding surface of the crown, was colored almost black by a moderately sized filling of amalgam. More or less discoloration is usual, but in some mouths amalgam fillings remain for months or perhaps years without discoloration, but such are liable to be discolored at any time, whenever the fluids of the mouth are sufficiently changed by disease or other causes to act upon them, and then we have a peculiarly repulsive aspect presented within the oral cavity, which, to say the least of it, is anything but desirable. We have said, thus far, nothing about the toxicological properties of mercurial oxides which in some few susceptible patients must be taken into consideration, but which, as a general thing, will not produce any serious consequences.

A healthy public opinion in this country has banished all amalgam fillings from the front teeth, principally on account of the discoloration consequent upon its use, but we sometimes see the mouths of patients from the old country full of teeth plastered up with amalgam fillings, even incisors and cuspids. Indeed, persons of wealth and intelligence in Europe are not nearly as particular in regard to these wretched disfigurations of the teeth as are the servant girls in America.

As to Hill's stopping and oxy-chloride of zinc, we would only remark that they are entirely inadmissible for permanent fillings. Tin foil has nothing to recommend it, not even the poor plea that has been made in favor of amalgam, i. e., that it is easily used. Now what can be said in favor of using any of these substances for filling or rather in extenuation of their use?

A poor operator can fill a cavity with oxy-chloride or amalgam so that the filling will remain for a certain time under circumstances and in locations that would render it impossible for *him* to fill the same cavities with gold: and a poor operator would be

more apt to so adapt the material to the margins of a cavity as to prevent subsequent decay, than he would if he made use of gold. This, we must confess, is not a very flattering commendation in favor of amalgam fillings, but we feel that justice requires that it be strengthened a little by remarking that in some few cases, when the difficulties to be overcome are such as to render it impossible to ensure a good gold plug, by the best application of skill and patience, it would be admissible to use the amalgam.

I have purposely said nothing in relation to the necessity of using cheap material. This cannot be ignored by many practitioners, and they must adapt themselves to circumstances which they cannot control, but we would admonish them that a judicious and competent practitioner can control these adverse circumstances by which they are surrounded to a much greater extent than they suppose, and it will always be well to make constant and persistent efforts in that direction. If, however, we determine to make use of gold, we find various forms of gold prepared for use, such as crystal gold, shredded gold, corrugated gold, adhesive gold foil, non-adhesive gold foil, and it behooves us to determine which is the best suited for the uses to which we wish to apply it. At the present time adhesive foil is doubtless much more extensively used than any other of these varieties. Each variety has, however, some property that is characteristic of itself, and which is valuable in its place. For instance Lamm's shredded gold is more adhesive than any other variety that we have used, whilst Morgan's crystal gold adapts itself to the bottom of a cavity more closely than any other variety, and seems almost to adhere to the tooth substance itself, while soft, or non-adhesive foil is more easily and perfectly adapted to the margins of cavities than any other variety that we are acquainted with, though the adhesive perhaps combines more desirable qualities than any other.

Good fillings may be made with any of these, but in cavities of certain shapes non-adhesive foil alone will not suffice. Crystal or plastic gold, as it is most frequently called, has fallen into disrepute among a great many operators because it did not fulfill their expectations, its virtues having been lauded too highly

by its friends. It has been said that the tooth decays beneath the plug, as is evinced by a dark discoloration around the filling. This is true in many cases, but it is equally true of cavities filled with foil, and oftener true where adhesive gold is used than where non-adhesive gold is made use of, and the philosophy of the discoloration is the same in all of these cases. Either the diseased substances were not all removed in preparing the cavity, or the filling does not entirely exclude the fluids of the mouth; and these conditions obtain more frequently where plastic gold has been used, because much less care has been taken, as a general thing, in filling with this than with foil, it having been claimed at first by its friends that much less time was required than in filling with foil. This was a great mistake, as it really requires more time and care to make a perfect filling with it than it does with foil. The same may be said of Lamm's gold. We have seen as fine fillings made of each of these preparations as were ever made with foil. The corrugated gold foil has but recently been introduced to the notice of the profession, and its friends claim that it is as easily adapted to the margins of cavities as non-adhesive foil, and still has all the desirable properties of adhesive foil. We have seen very creditable operations performed with it, but the future must determine upon its virtues.

(To be Continued.)

TO FASTEN LOOSE UNDER INCISORS.

From various causes, the alveolar processes of the under incisors become extensively absorbed, and we find the teeth very loose; so loose, indeed, as to be almost extracted with the fingers. They give much trouble to patients in eating, and otherwise annoy them. Now it is often the case that these teeth can be retained many years if they can be *fixed*. They need to be made firmly stationary, so that the constant motion caused by the tongue shall not produce a sub-acute inflammation, and further absorption of the bone. Some practitioners would recommend immediate extraction and artificial substitutes. Believing that

the natural teeth are far more desirable, the writer would endeavor to fix the former.

Ligatures have been in use from time immemorial for this purpose, of silk, gold wire, &c., &c. But a far better method is to *rivet* them to the adjoining sound teeth.

Let us suppose the under incisors to be all so loose that they must be either immediately extracted or rendered immovable by artificial means.

We will first fasten the right lateral to the cuspid, the latter being firm. Take a drill of No. 23 guage, and make a hole entirely through the tooth, from the labio-mesial surface to the cuspid surface, anterior, of course, to the pulp chamber. However, there is not much danger of finding a pulp chamber above the gum in these teeth, in persons above fifty years of age. The hole should be commenced near the length centre of the tooth. Now place the loose incisor where you wish it to stand when riveted, and continue on drilling so as to make a hole in the cuspid of the same size as the one in the incisor. The drill is to be kept in the incisor while drilling the cuspid, so that you will be sure that the long axis of the drill holes will correspond in direction. Drill about half way to the pulp cavity of the cuspid, or even a trifle further.

If there should be sensitive dentos,* you can use chloride of zinc, wait for its effects, and then proceed with the operation.

Make a gold screw, one size smaller than the drill, with a head. Cut it a trifle short of the length of the two drilled holes and the space between the incisor and the cuspid. Fill both drill holes with oxy-chloride of zinc, and then insert and carry through the holes the gold screw. When in place, the head of the gold screw should be partly below the surface of the enamel. The head should be convex on its under side, and on its face, which latter should have a slot cut in it for the blade of the tiny screw driver. The latter would never be needed excepting to remove the screw, if necessary, after the oxy-chloride of zinc had be-

*Dentos—Tooth-bone.

come hard. The zinc should be very soft, or even creamy when the screw is inserted.

The head of the screw will partly bury itself in the canal made, and the oxy-chloride of zinc will form with it here a tight joint, as well as at other exposed surfaces, and thereby prevent decay.

The exposed surface of the gold screw will look like a *plug*, if it shows at all. The remaining incisors may be fastened to each other, and the left one to the left cuspid in the same manner as described.

No movement of the teeth should be allowed until the "O. C. Z." becomes hard. So little of it is exposed that it will not wear out as in an ordinary plug.

If one considers it desirable, the *openings* of the drill holes could be made larger than already indicated, and plugged with gold, around the gold screws. C.

TEMPERING INSTRUMENTS.

(*To Students.*)

The quality of the cutting instruments which the Dentist uses in the preparation of cavities, is of the first importance. It is wearisome and annoying to endeavor to prepare a cavity with instruments whose edges turn at the first stroke after sharpening, or whose blades break on slight pressure. The latter is, however, preferable to the former.

Very few dentists make their own excavators and chisels. The majority who do not, cannot *temper* them properly.

One who operates much, *uses up* a large number of excavators monthly, and it is quite an annual tax to have them re-pointed by the instrument maker. Most instrument makers give too soft a temper to excavators and chisels. The blades of the instruments should be finished with a *straw* temper, not orange. Orange temper is too soft for instruments used in cutting dentine and enamel.

I consider water preferable to any other fluid in tempering. With this I have no difficulty in always getting a fine temper for every instrument. There need be no *guess work* about it. As soon as your instrument is tempered, the color of the blade will tell you whether it is right or wrong.

Shape all your instruments as you wish. With a large flame and a blow pipe heat the blade of an instrument red hot, throwing the flame first on the neck and then on the blade. Have a cup *full* of *cold* water immediately under the point of the instrument and when it is red hot quickly slip the point into the water. Don't attempt to heat more than one at a time; if you do, probably one will not be as hard as the other when cooled.

There is now an oxide of iron on the blade of the instrument you have heated and cooled. The blade is very hard and brittle. You cannot use them until you have *tempered* them.

But proceed and harden them *all* before tempering them, as it takes less time. Now take corundum or sand paper and brighten one side of the blade and neck of every instrument that you have hardened. The reason for this you will soon discover.

Now reduce the flame of your lamp until it is so small that it won't *flicker*,—the flame of an annealing lamp is about right—place the shank of the instrument, near the neck, in the point of the flame, and keep it steadily there until you see the following effects, viz: first the shank turns straw color, then orange, then blue; and the blue runs along the shank of the instrument until the neck is enveloped. At this instant drop the point of the instrument into the cup of cold water, which must stand under or close to the point of the instrument. If you have done it just right you will find that the blue shades quickly off into orange on the blade nearest the shank, and the orange into yellow further on. So that all of the blade which you will ever wish to use is *yellow*, and of exactly the right hardness.

If you had not polished the blade after *hardening*, you could not have seen the changes of color taking place while tempering or heating the last time.

If the cup of cold water is too far away from the lamp your instrument will be softer than you wish after cooling it the sec-

ond time, for the *blue* will run into the blade and take the place of the yellow color which was there before it, while you are moving it a long distance.

A little practice will make you all right in tempering.

If, after tempering an instrument, the color does not look *exactly* right, heat it red hot and harden it again, and temper it better this time. Don't say, "O, I guess that'll do." Place no excavator in your case that is not well tempered, for you'll take it up some time, and lay it down quickly with a mental "confound it," or "damn it," according to your education.

A CASE.

By G. V. Black, Jacksonville, Ill.

December 22, 1868, Miss S. called and had four fillings made. They were ordinary fillings of gold in the posterior approximal surfaces of the second superior bicuspids and the grinding surfaces of the first lower molars.

The pulps of the teeth were not exposed nor nearly so—the teeth were sensitive, but not abnormally so. The fillings were made in the ordinary manner with mallet pressure and adhesive foil. The patient is 17 years of age, in robust health, bilious sanguine temperament; lives in the country; is in school; is an unusually close student, and very intelligent.

March 15, 1869. Patient reports that the teeth were very comfortable for a time, but soon became sensitive, not particularly to changes in temperature, but sharp pains would spring up in them *without any apparent exciting cause*, continue for a short time, shoot about through the jaws and head and die away again. The pains became more and more frequent and of longer duration, and the teeth became rather more sensitive until it was proving a very great annoyance. On questioning her I found most complaints of the right superior bicuspid, from which I removed the filling; tried pressure over the point nearest the pulp with a small smooth point, without producing pain. Introduced

two thicknesses of quill as a non-conductor, and refilled with gold.

April 3. No improvement, but all the symptoms becoming more marked. Removed filling from right superior bicuspid, and destroyed and removed the pulp in the usual manner, as the greatest distress was referred to this tooth. As steady warm weather might soon be expected, I advised the patient to bear with the others, hoping that they would get better without devitalizing them.

June 4. The pain has been somewhat fitful, sometimes being almost entirely abated for a week at a time, then springing up again, but it is just now greatly aggravated; its general character remaining the same as at first. There is not the least tenderness or soreness about the teeth upon pressure or percussion. Ice water shows them to be more sensitive than the adjoining teeth, but not greatly so. Destroyed and removed the pulp from the other bicuspid; removed the fillings from the lower molars. The surfaces of the cavities were quite sensitive, but not more so than, nor even as much so as many teeth that are successfully filled. I did not like to destroy the nerves of these teeth, they could not be very nearly exposed.

The patient, as well as her parents, were questioned very closely in regard to her general health, as to pains in other parts, and everything that could have an influence upon this peculiar irritation without eliciting anything farther than that the pain darted through her head considerably, and was sometimes located with some difficulty. I omitted to mention that I had previously treated her constitutionally for miasmatic neuralgia, with only slight temporary relief.

I filled the teeth with Hill's stopping, and dismissed the patient with orders to report if they were not better.

July 8. Patient returned with the pain worse than before,—she had reported to me frequently since the last visit. There is no reason to believe that the removal of the gold, and the substitution of a non-conducting filling has been any benefit. There was no more pain referred to the teeth from which the pulps were removed. The pain had now become unendurable, and the pulps

were destroyed without farther parley. The next day, while removing the pulps and filling the roots of the teeth, I noticed that one of her ears was discharging pus, and questioning her about it, she said that for two or three days her ears had been sore; this was the first time they had run any. She admitted that there had always been some pain about her ears when her teeth ached, but felt very certain that it was the teeth that caused it. Thinks the ears have sometimes commenced to hurt first, but not often, and they have never hurt her badly without the teeth aching too.

June 20. Received a note from patient saying that the pain had entirely passed away; her ears were still discharging a little but were nearly well.

I regret exceedingly that these pulps were destroyed just at the time that pus was first discharged from her ears, for it is now my opinion that the whole trouble belonged to the ear. The thick covering of dentine over the nerves—the entire absence of irritation about the teeth—the almost entire absence of the sensitiveness to changes of temperature usual in such cases—the pulps themselves were found as nearly normal as any pulp could be when devitalized with arsenic—the final ulceration of the ears, almost before the patient was aware of their being sore or painful—go to show that the ears were the seat of the disease.

ANOTHER CASE.

Mr. W. C. O.—Among other teeth I filled an ordinary approximal cavity in a central incisor. This was six years ago. Time passed on, and the tooth did duty as the rest without any sign of trouble, until about six weeks ago, when it became very sensitive to changes of temperature. This continued to increase for about ten days when it became a severe continuous odontalgia. This soon terminated in suppuration of the pulp and consequent alveolar abscess, in which condition the patient applied for relief. Taking a drill I started it into the palatine surface of the tooth, and bored through to the pulp canal. *I was surprised to find this cavity fully four times its ordinary size, and the filling protruding slightly into it.*

Now how had this enlargement been brought about? The pulp had become slightly irritated and swollen, and thus had brought a continuous pressure against its walls, these walls had been absorbed on account of this pressure, and the great enlargement is the result.

It seems a little singular to me that such an enlargement as this could occur without any uneasiness to the patient. It is not to be supposed that this enlargement could have occurred after the tooth became sensitive, for there had not been sufficient time; yet it was perhaps very slowly at work for the whole six years, and finally when the pulp lay against the gold filling, and began to be indented by a substance it could not remove, and changes of temperature were of more effect, the previous slight irritation became active inflammation.

That this same thing in a somewhat less notable form occurs frequently there is no doubt. Almost every dentist of close observation, who has been in practice for a few years, has been surprised to find an exposed pulp on removing a filling which he had inserted a few months previous, at which time he felt very sure there was no exposure.

I have been pained to hear a brother dentist telling his patient that certain of his teeth had been filled "right on the nerve," and in this manner casting a severe and undeserved slur upon his neighbor, when the exposure had, in all probability, occurred in this manner.

AMMONIATED GOLD FOIL.

The paper read by Dr. Black, of Jacksonville, Ill., at the Quincy meeting, in May last, showed the fact that adhesive gold foil, exposed to the vapor of carb. ammonia, lost its adhesiveness. I have taken advantage of this fact, and whenever I wish a pellet of soft foil, I enclose a sheet of *any* kind of gold foil in a collar box having a hole through the bottom the size of a penny, and set this box over a bottle of carb. ammonia. In five minutes it will have lost its adhesiveness, and will form into a pellet of

the softest character. This soft pellet I use at the bottom of a cavity, and add adhesive gold to it.

The vapor of carb. ammo. adheres to the surface of adhesive gold, and prevents the leaf, as it is rolled up, from adhering to itself, so that it *seems* soft, although, in fact, it has not changed a particle in this respect. The surfaces of the foil having a thin film of gas adhering to them, prevents the adhesion of the surfaces to each other, and they *slide* upon one another, and thus the leaf is formed into a small pellet, which is very *soft* as a *pellet*. Now the *adhesiveness* of the gold in the *interior* of the leaf,—that portion not exposed to the gas—is not in the least destroyed, and so when it is packed into the bottom of a cavity, and the surface broken up by the serrations of a plugger, there is no trouble in making adhesive gold foil unite with this chemically treated, or ammoniated pellet.

The advantages to be gained in thus treating adhesive gold foil are so great, and so obvious to the *operator*, that more need not be said on that point. I prefer pellets prepared in this way to sponge or crystal gold. C.

CARBOLIC ACID AND GLYCERINE AS A REMEDY FOR SALIVATION.

By William H. Thrift, D.D.S., Boonsboro, Iowa.

In reading the paper that was read by W. B. Davis, M.D., before the Cincinnati Academy of Medicine, June 7, 1869, I was led to think that carbolic acid would be a proper treatment for salivation. Since then I have had occasion to use this valuable agent in combination with glycerine, one of the former to six of the latter, in a case of salivation from the use of mercurial medicines, in which most, if not all, of the teeth could be moved with ease by the tongue.

I directed the patient to take the above medicine and apply it to the gums (from three to four times daily) by the use of a camel's hair brush.

The results that followed this treatment were as follows: On the second day after the first visit of patient, the gums gave fair

indications that they would recover under the treatment. At this sitting I removed such amount of tartar as was advisable on account of the looseness of the teeth. On third visit I found the teeth sufficiently firm to warrant me in removing all remaining traces of tartar, which I did, and discharged the case, as it required no further treatment.

THE FOOT-SHAPED PLUGGER.

This instrument is one which I value highly. All sizes are more or less useful, but I find great advantage in using the very small sizes. The very small size answers wherever the round pointed plugger is required. The foot should in some cases be *very short*. The *toe* should be rounded, as square corners endanger the enamel when working along its side. Some of these pluggers should be as small as the smallest excavator; the serrations should be shallow and sharp; the shaft should be slender, as slender as safety will permit. Many of the foot pluggers are clumsy in this respect, and in approximal cavities do not work well. If instruments are purchased, defective in this respect, they may be remedied by grinding down on a corundum wheel, thereby saving heating and re-tempering. From six to twelve of these foot instruments will be found invaluable in the case of every good operator. The more inaccessible portions of many cavities may be easier reached with the foot instrument than with any other. C.

INSANITY CURED BY EXTRACTION OF DECAYED TEETH.

A late number of the *American Journal* describes the case of a lady who was insane, and the inmate of a hospital for three years, who was suddenly cured by the extraction of a number of decayed teeth and roots.

Physicians are continually thwarted in their best efforts to cure diseases, by overlooking the condition of the patient's teeth. The general practitioner should insist on it, that their patients should have their mouths put into a healthy condition, either by extraction or plugging. C.

Mechanical and Miscellaneous Department.

THE AMERICAN DENTAL ASSOCIATION.

The Association, which met recently at Saratoga, was well attended, delegates being present from nearly all of the States, and some members of the profession were in attendance from Canada. Instead of taking up two or three days with useless wrangling over some unimportant business affairs, as was done the year before at Niagara, the first day of the session found the Association well at work upon its legitimate business. The report upon pathology and surgery elicited a lengthy discussion, which was listened to with much interest, though some of the details might have more properly been brought out under a different head. The most important point that attracted special attention, was the practicability of capping live pulps with oxychloride of zinc and filling over them, and upon this point much valuable information was elicited, derived from the experience of the various members who had made experiments in that direction. We are constrained to believe that the advocates of this practice have increased in the last year, and that those who have practised it have, as a general thing, been strengthened in their convictions of its usefulness. It is probable that the best practice will finally be found to occupy an intermediate position between those who cap indiscriminately, and those who devitalize indiscriminately, though there is some truth in the remark which was made during the discussion, that "there was always time enough to destroy the pulp," thereby indicating that it was always proper to attempt to save it alive; at any rate, it will be proper to save it in favorable cases. In cases where there has been frequent attacks of pulpitis, especially where the pain has been considerable, and where there are probably organic changes in the tissues of the pulp, the chances for success will undoubtedly be less.

Many other circumstances must likewise be considered, such as the general health, the degree of irritability of the patient, which in many cases is such as to almost preclude the possibility of effectually cleaning out the cavity, and properly treating the pulp itself. The operation, however, is recognized as one of the common methods of treatment, when the pulp is exposed, whether recently or not, and although some may oppose it for a time, it is not probable that it will become less popular than it is at present.

The number of new fixtures and appliances exhibited was not very numerous, the most important, perhaps, among them was the gas and chloroform inhaler invented by Dr. O. Wilson, Aurora, Ill. The chloroform inhaler being so constructed that a definite proportion of atmospheric air shall always be mixed with the vapor of the chloroform. An ingenious but somewhat complicated instrument for an automatic plugger was exhibited, and Morrison's chair, which was also shown at Niagara, seemed to elicit universal admiration. Palmer's plates of the dental arch, particularly those exhibiting the fissures of the various classes of teeth, and the way in which he proposed to prepare them, when decayed, for filling, presented an interesting subject for thought and discussion, and elicited considerable attention. Among the improved bases for teeth was noticed Hale's method of attaching teeth to aluminum, which for whole sets makes a much better plate than rubber, with no greater expense except some little additional labor.

The mechanical department did not receive as much attention as it should have received, not, however, because there was a want of interest in this department, but because the time was mostly spent before the subject was reached.

The general harmony of the session was not disturbed, the utmost good feeling having throughout prevailed, and, as a general thing, the session was marked by energy, by close attention to the business legitimately belonging to the Association, and a disposition to ignore all outside and irrelevant issues, by decorous deportment, by the ability displayed in debate, and by a much more strict observance of the precepts of parliamentary law in

the transaction of the business matters which came before the Association than have been manifested in some former sessions of this body. And, although no very great discoveries were heralded for the admiration of members, nearly all felt that the meeting was a profitable one, and we think few left without feeling strengthened for the work that is before them; and we have no doubt that the members generally will be better fitted for the performance of their duties in the future than they would have been if they had neglected to attend this session of the American Dental Association. J.

MISSOURI STATE DENTAL ASSOCIATION.

JUNE, 1869.

Discussion following a Paper read by Prof. JUDD, on the Subject, "Ossification of Dental Pulp." published in the August No. of the JOURNAL.

Dr. Chase, being called for, said:

I would prefer not to be the first to speak on this subject. In regard to the paper that Dr. Judd has read, it is very important for us to understand some of the points that he mentions there. Nothing is more common for us than to speak of the ossification of the dental pulp; in fact, we are continually using that term. It is a very convenient term to be used to be sure, but still, as he has already shown, it is not correct in by far the majority of instances. I think the larger number of hardened pulps that I have examined have not been ossification. I know that probably not one out of ten that I have examined had much, if any, ossification of the pulp. True ossification, as we all know, must have true bone cells, as well as hardening by lime salts—true bone cells as well as those cells hardened—whereas, as I have already said, we have calcification of the pulp without any true bone tissue. That is merely the pulp in its natural state, I might say, with all its arteries, its blood vessels, just calcified. I think I showed Dr. Judd, a year ago last winter, a specimen I had under a microscope, at his office, where we could see the

vessels just as we supposed them to be in their natural condition, but still perfectly hardened. There was true calcification of the pulp, and, therefore, although we often use the term, "ossification of the pulp," yet, in the cases that I have examined, I have come to the conclusion that it is seldom the case that we have ossification of the pulp.

We have a partial dentification of the pulp, together with ossification; as we often see the dental tubes mixed in with hardened cells. I have had occasion many times, as, no doubt, many of you have also had, to treat undecayed teeth which had become very sensitive and painful. It seemed to be an inflammation of the pulp. I have treated these teeth by drilling to the pulp cavity, intending to kill the pulp, but it has been invariably the case that I have found no opening of any consequence in the pulp cavity. I have found the pulp entirely filled with calcareous matter, solid matter, a perfect hardening of the pulp, and, in common parlance, ossification of the pulp. I think in the majority of cases I have had to treat in this way, where the teeth have needed treatment for inflammation to prevent pain, I have found, more or less, calcification of the pulp. I have, in the last year, had three or four cases: one was a central incisor, very sensitive to cold water, and to the action of draughts of air, &c., and this continued, more or less slightly, for a long time, until it gradually increased until it became unbearable. When the case came to me, I drilled the pulp cavity, intending to destroy the pulp. I found an almost imperceptible opening into the root canal. Although I had drilled into this central incisor just at the margin of the gum, yet I found a hair-line opening, and, as I continued my excavation down towards the point of the root, I still found the cavity, almost shut up by hardened material, and so have I also found it in the molars.

Now this hardening of the dental pulp is something that is difficult to account for. We cannot tell under what circumstances we may always find it. It is frequently the case that there has been no abrasion whatever of the tooth. I have in my mind now, a case of the left under wisdom tooth, which was not abraded in the least, but it had become exceedingly sensitive to drinks,

and almost to the motion of the tongue. At last the pain became unbearable, and I drilled to, what I supposed, the pulp cavity, and found the pulp cavity filled with calcified or hardened material. I think it is often the fact that it is hard to diagnose a case of ossification of the pulp, because it is frequently the fact that the patient has, more or less slight or severe pain, and it may go on without ever being presented to the dentist, and it may not, in some cases, be presented to the dentist at all; and, finally, the person gets entirely well. If, after a while, the tooth may be extracted, we find that there has been a great hardening of the pulp. Well, now, where we have a tooth that is undecayed, where there is no cavity, but where, however, there is more or less pain occasionally, from draughts of air and cold water, and when there seems to be an inflammation of the dental pulp, why, unless there is some other good reason, we may suppose there is a morbid process going on there.—a hardening or calcification of the pulp,—and, by the way, I think we should always use the term, calcification of the pulp, as a general term, instead of the word *ossification*, because it is in fact always calcified, whether it is dentified or ossified: as I say, where you have this continued pain, slight or more severe, going on for some time, we may presume there is calcification of the pulp taking place. So far as the remedy is concerned, I must confess that I dont know of any remedy for it except destroying what remains of the pulp that causes the pain in the tooth. No doubt, in the majority of cases persons could not continue to bear the pain until it would ultimately cease from complete calcification of the whole pulp, as has often happened. When the pain becomes unbearable, why then I don't know of any better way than to destroy the remaining portion of the living pulp. There is, of course, the general treatment for reducing inflammation, but a patient in very much pain, would not submit very long to anything severe. They would want something palpable done to the tooth to *stop* the pain.

Dr. Kulp:—I did not wish to open this discussion, therefore I refused to speak on this subject when my name was called. This is a subject I have been greatly interested in during the last few

years, and I heartily agree with everything said by both the essayist and Dr. Chase, especially by Dr. Chase, in terming it calsification instead of ossification. I have yet failed to find a perfect ossification. I have several specimens that I intended to bring down with me, but I forgot them, I am very sorry to say. One case in particular that interested me very much, that I don't know as I ever saw before—a case of calcification of the nerve of the cuspid. It was rather a peculiar case. I found there were two or three places in the nerve that were hardened, while between these hardened places there were soft spaces. I found the inner (bulb of the) pulp seemed to be calcified, and in pulling it out there seemed to be enough tenacity in the remaining tissue to cause it to hang together and I pulled it out and found the nerve had three or four hard places in it. I think I have the nerve preserved, as it is, with these hardened places remaining. Perhaps there are three or four, say an eighth of an inch between one and two, and the others a little closer together. The same patient has had three or four cases of a similar kind, and this case came to my mind while Dr. Chase was speaking on this subject of the calcification of the pulp. Thinking over it, and thinking of the patient in whom I had observed it, it occurred to me that I have found these have been patients who lived upon strong animal diet, or dieted upon the food rich in chemical elements, such as the phosphates of lime and carbonates of lime. In this particular case, the patient was a very strong, hearty man, a butcher by trade. I asked him what he lived on. He was a German, and he said "beef." He lived upon beef principally. "Many times I makes a whole meal of beef," he said, and I find it the same in most all the cases where I have found the spaces of this pulp ossified, that it has been in patients who have lived principally on beef. I would like to hear from others on this subject, and to ascertain what kind of patients they have found this to occur in. I think this is a subject that all ought to think of, if we have not already thought about it, hoping we may find some light in this consideration. I have nothing new to offer upon the microscopic observations of calcified pulp, more than what has been said already.

(*To be Continued.*)

REPAIRING ARTIFICIAL WORK.

After the machinist has mastered the successive steps in the construction of an engine, he is required to spend some portion of time in repairing machinery before he receives the diploma of a master workman. This requirement is considered necessary from the recognized fact that it is one thing to be able to construct a piece of machinery, and quite a different matter to be qualified to repair the same in the best and most expeditious manner. In the mechanical department of the art of dentistry the same facts are patent, and the same requirements might well be added to the curriculum of our dental colleges.

In view of these facts, I know of no subject on which a few practical hints could better be bestowed, and as it seems to have been made my province to help light up some of the dark places, I purpose publishing a few thoughts on the best methods of repairing mechanical work.

I will take cases as they are ordinarily presented to the dentist. No. 1. A full upper set on gold, gum teeth, rimmed. Central incisor broken off, leaving the lining perfect. The simplest and quickest mode of repairing this case is manifestly to fit a new tooth, and secure it to the plate by riveting it fast to the old lining. Much care should be observed in the selection of a tooth. It should not only be of the proper size, length, and color, but of the same thickness and shape; the contour of the gum the same, and the rivets should occupy the same position as in the one broken off. Having selected a tooth, the rivets in the old lining are to be cut off with cutting pliers or a file, even with the surface of the lining. The tooth should first be ground to fit the space laterally: the base may then be ground out till the ends of the rivets will touch the lining when the tooth is in position, with the cutting edge on a line with the others. A little wax on the surface of the lining will indicate the exact position of the holes for the rivets, by pressing the ends of the rivets into it. The holes should never be made with the punch, but be made with a drill of the exact size of the rivets. The fitting of the tooth can now be completed. It will sometimes be found difficult to bring

the tooth close up to the lining on account of a ridge formed by the solder at the base of the lining. If this ridge cannot be cut away with a chisel, the tooth must be ground off a little at this point. The holes should be well countersunk on the lingual surface, the tooth placed in position, and a cruciform incision made in the end of each rivet with a chisel beveled alike on each side.

Take the plate in the left hand, lay the tooth on the *end* of a piece of hard wood placed on a solid foundation, and with a small hammer, and quick, light blows, rivet the tooth fast, holding it in position till completed: dress off smooth, and finish with the burnisher. E.

(*To be Continued.*)

CORRESPONDENCE.

MARINE, Ill., Sept. 2, 1869.

EDITOR MO. DENTAL JOURNAL:

You invite the profession in general to contribute articles to the Journal. And, being acquainted with a case which, from its singularity, I thought might prove of interest enough to merit a small space in your journal, I will endeavor to give the particulars of the case in as few words as possible.

Mr. C. called upon me last April for a full denture, a want which nature had failed to supply.

Upon examination, I found four superior teeth which, he assured me, were all that he had ever had. Two of these occupied the place of the first molars, the crowns of which were only half the usual size, with very fine cusps: another occupying that of the right central incisor, had a crown tapering to a point as if it had been cut down with a pencil-sharpener; and the other, that of the right canine. The crown of this resembling a wedge in shape, with the edge slightly turned outward.

These I extracted; the roots as well as the crowns were short. The roots of the two anterior teeth had the appearance of centrals. The two posterior, which, from the appearance of their crowns, were rudimentary molars, had very short and flattened

roots, and bore a strong resemblance to those of the bicuspids: but occupying a position in the alveolar arch as above. Besides these, I took away what remained of a deciduous tooth, which, his mother informed me, appeared about the thirteenth month: the others made their appearance about the twelfth or fourteenth year. Among other peculiarities of this person is that he never perspired: the skin is consequently dry and shriveled, giving him a prematurely old look; is bald, having but little hair, and that at the base of the crown. His age is twenty-four years, rather under size, has a sound mind, and, as he says, enjoys ordinary good health.

I have models of his mouth, made from impressions taken six weeks after the removal of the teeth, which I will deposit in the College Museum, if desired. He is now wearing a full denture, as I believe, to his entire satisfaction.

The respective ages of his father and mother are 45 and 50 years, whose teeth are unusually good for that age, and who inform me that there are no other peculiarities of this character among the family connections.

Very Respectfully, Yours,

S. H. Smith.

ALLOYS FUSIBLE AT LOW TEMPERATURES.

We have known for some time past, several alloys fusible at temperatures below the boiling point of water. The one commonly known by the name of Newton alloy consists of eight parts of bismuth, five parts of lead, and three of tin. It fuses, according to Pelouse, at 94·5°, and according to Thenard at 90°. The one by D'Arcet, the most celebrated of all, is made of two parts of bismuth, with one part of lead, and one of tin: it melts at 93°.

In a treatise on chemistry by Pelouze and Fremy, we are informed of another, composed of 5 parts of bismuth, three parts of lead, and two of tin, the fusing point of which comes as low as 91·6°.

Dr. Wood says that there exists another more recent than the

latter, which was described in *Silliman's American Journal* as containing from seven to eight parts of bismuth, four parts of lead, and two of tin, to which two parts of cadmium are added. It is said to fuse between 66° and 71°. While engaged in galvanoplastic experiments, M. Lalance used seven to five parts of bismuth to one to five parts of cadmium. The alloy which he thus obtained fused at the low temperature of 66°. The most surprising feature in this discovery is that its difference from the other alloys consists in the addition of a metal of more difficult fusibility than any of those contained in the ordinary alloy. The cadmium by itself only melts at a temperature of 360° C. The other components, lead, bismuth, and tin, fuse at 312°, 276° and 230° respectively. Another point worthy of note in the preparation of alloys is the peculiar use made of bismuth. From the undermentioned table it will be at once apparent that the alloys at present in use consist to the extent of exactly one half of their weight of bismuth:

Metals.	Alloy of Newton.	Alloy of D'Arcet.	Alloy of Pelouze.	Alloy of Wood.
Bismuth	600	600	600	600
Lead	375	300	360	320
Tin	225	300	240	160
Cadmium	—	—	—	120
	1,200	1,200	1,200	1,200

The next discovery in this field ought to be an alloy fusible at the ordinary temperature.—*Scientific American.*

MORTALITY OF FOUR NORTHERN CITIES.

Commencing January 1, 1869, and ending July 1, 1869. A period of six months.

Cincinnati, with a population of 230,000 inhabitants, had	2,296	deaths.		
Boston,	"	240,000	"	2,671 "
Chicago,	"	252,000	"	2,254 "
St. Louis,	"	240,000	"	2,186 "

These figures were obtained from the Clerks of the Boards of Health of their respective cities.

During these six months one person in every 89 of the population died in Boston,
" " " " 109 " " Cincinnati.
" " " " 110 " " St. Louis.
" " " " 111 " " Chicago.

The mortality in these cities for the month of July, was as follows:

Boston	542
Chicago	815
St. Louis	734
Cincinnati	412

C.

The Missouri Dental Journal.

A MONTHLY RECORD OF THE SCIENCE.

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[*From the Cincinnati Medical Repertory.*]

MODERN METHODS OF INVESTIGATION.

By HARRISON ALLEN, M.D., Professor of Zoology and Comparative Anatomy in the University of Pennsylvania.

The recent assertion of Cohnheim* that in certain conditions of the parts involved, white blood corpuscles are capable of migrating through the walls of capillary blood vessels into perivascular areas, is a convenient theme to employ in briefly reviewing the modern theories of pathology—their significance and origin.

In 1846, Aug. Waller,† in examining the mesentery of a toad and the tongue of a frog, found that both the red and the white corpuscles may traverse the walls of the capillary vessels. In addition to the above inquiry we will endeavor to ascertain why it was that Waller's experiments were, soon after their appearance, consigned to obscurity, while a quick recognition awaited their repetition fifteen years afterward.

There can be but little doubt, although there are many who ignore it (indeed, sufficient to influence medical education in this country) that from the natural sciences is derived the idea which underlies and gives tone to the thought of the century. The discernment of the presence of plans of structure and laws of life in the organic world: the exchange of artificial for natural systems

* Virchow's Archiv. Band, 40, 38. Prof. Kaloman Balogh (Archiv. de Physiologie, 1869. 152) has carefully repeated these experiments, without, however, confirming Cohnheim's conclusions.

† Lond. Edin. and Dublin Philosophical Magazine, 1846, vol. xxix, p. 271.

of classification by Cuvier and Jussieu ; and more especially the establishment by the former of the law of correlation of structure, have exerted an influence over the thinking world that continues to give a decided bias to its investigations.

It is not a little remarkable that one of the chief subsequent causes determining this should have had its origin with one less frequently associated with science than with literature, but who, in reality, belongs to both. We allude to Goethe, who has variously expressed in his writings the grand truths of primal harmonies, and of the inherent capacity for development possessed by both forms and ideas, which are propounded in the law of the morphology of the plant, and in the theory of the construction of the skull, as well as in his strictly literary productions, such as Faust and Wilhelm Meister.

A numerous corps of writers, following in the same direction, have since so far welded science and literature together that they may be said to have now a common object. At all events, such an effect upon medicine is decided, and while perhaps unconscious of its influence, our investigators have demonstrated in the medical history of the nineteenth century their belief, or at least obedience to the philosophic teachings about them.

I.

The celebrated theories of our time have severally arisen as legitimate sequences of purely abstract investigation. The founding of general anatomy, comparative anatomy and zoology, were essential to the origin of such theories. We will accept this as a basis to assume—as we believe we justly can—that all we have that is true in pathology can be traced back to the time of the founding of these sciences on the schools respectively of Bichât and Cuvier. The names of men attached to this or that hypothesis, are, as a rule, those of go-betweens, who, in search of novelty in striving to explain the obscure processes of tissue change, unconsciously, it may be, often appear to the profession under false pretenses. Thus the discovery of multiplication of cells by division by Mohl in 1835, was essential to the theory of Schwann, as it was to the subsequent cellular pathology of

Virchow. These distinguished men deserve all the reputation they have secured, but they are just so far indebted to Mohl, who appears to have done for vegetable what Bichât did for animal anatomy—that they were simply ingenious in applying his facts to their inferences and wants.

The establishment of embryology by Von Baer,* in 1828, and the dissemination of the general features of development of the embryo, gave to Goodsir his occasion for the doctrines of centres of nutrition, and to Beale for that of the germinal theory of histogenesis. The introduction of the same truths to the field of surgical pathology by Paget, has given British surgery a tone which has done much to elevate this department of medicine in other countries, besides securing for its author a brilliant reputation.

In 1830 Ehrenberg discovered that in slow-moving or stagnant waters a numerous life was constantly present, whose forms were, for the most part, members of the lowest division of the animal kingdom. The line of research thus opened by him has demonstrated that an organism can be as simple in construction as a cell, and that the differences between them are not so much those of outline as of action. Since it has been shown that detached masses of "germinal matter" may appear in globular masses in the blood as white blood corpuscles, in mucus as mucous corpuscles, in pus as pus corpuscles—always maintaining an identity, and securing, by more or less irregular and contractile form, a resemblance to one of the lowest of organisms†—a tendency has been evinced by some observers to assume that such and other like masses within animal fluids are not essentially different from simple and semi-homogeneous organisms without. We are thus prepared for a theory dependent upon the motion of such ultimate particles, viz., that of Cohnheim; and are not surprised that another observer‡ finds a great variety of distinct

* Von Baer first applied embryology to classification of animals. He acknowledges Dollinger to have been his master, whose writings date fourteen years earlier.

† Amœba, a genus of Protozoa. Hence the movements of these masses are characterized as amœbaform; or, more properly, amœboid.

‡ Dr. Salisbury; see in refutation a paper by Prof. H. C. Wood, jr., entitled

entities in the blood, among which he definitely enumerates the following: "Zoosporoid cells, animalcular bodies, diatoms, dismidiæ (*sic*), algoid cells and filaments, and fungoid spores."*

The same tendency is observable in other writers. Mr. Beale† inclines to the opinion that germs of bacteria may possibly exist in the salivary corpuscles. Dr. J. G. Richardson‡ directly asserts their presence, and in a later paper§ employs them in explaining therapeutical action. The same writer affirms from experiments on his own person, that the "bacteria" of the blood can be increased in numbers by swallowing "a fluid ounce of water, which contained, by estimate, 7,000,000,000 of living organisms."

The *escape* of a white corpuscle from the blood is but a step removed from the assumed possibility of the *entrance* of bacteria into that fluid. If these active organisms can get into the blood through the walls of the capillaries of the alimentary canal, it is fair to suppose that they can as readily get out again. On this supposition we claim in advance the discovery that the so-called corpuscles of Colnheim are, in reality, nothing but escaped bacteria.

II.

In the same manner the different theories of inflammation may be found dependent upon similar precedents. Thirty years ago the theory of "action of vessels" was thought to be a great advance, as, indeed, in some respects—as, for example, in ascertaining the degree and nature of the increased temperature—it

Production of General Diseases by Organic Entities. Amer. Jour. of Med. Science, Oct. 1868, 336.

* Many of these names have no existence in the technology of science. Our author might have continued his ingenious nomenclature by splicing words somewhat after this fashion: celloid spore, sporoid cell, zoo-algoid filaments, etc.

† Microscope in Practical Medicine. Amer. edit. 1867, 176.

‡ Amer. Jour. Med. Science, July, 1868, 291.

§ The Identity of the White Corpuscles of the Blood with the Salivary, Pus, and Mucous Corpuscles. Penna. Hosp. Reports, vol. ii. 1869, 254.

‖ Experiments showing the Occurrence of Vegetable Organisms in Human Blood. Amer. Jour. of Med. Science, July, 1868, 291.

undoubtedly was, upon notions prevalent at that time. How completely a knowledge of development of the embryo changed such teachings, may be learned by a perusal of Burdach,* or by what is to us more familiar, of Paget's Lectures on Inflammation:† as well as to the deductions of the same school as announced by Simon turning the time-honored position of Travers and Muller, when he says: "In the primordial development of parts, we are able, without difficulty, to satisfy ourselves that organs which subsequently become dependent on blood vessels do at first grow quite extra-vascularly * * if, to use terms implying the relation of cause and effect between the intimate structure of such organs and their vascularity, we speak of the structure as determining the vascularity, but by no means of the vascularity as determining the structure. * * * The change of molecular structure determines the change of vascular supply."‡

In a more recent communication,§ the same author announces that "tissues are independent of blood vessels, except for the administration of food and the removal of refuse: that they develope or grow by the life of their own germs, and according to the several patterns which they respectively inherit; this doctrine, now almost universally accepted, has only been possible since the great discovery of Schwann."

The fact that the processes of inflammation are exhibited without the presence of blood vessels, gives plausibility to the position‖ of Colnheim. Since with him the structural elements of inflammation escape through openings in the walls of the blood-

* Physiologie, iv. 422.

† Lectures on Recent Progress of Anatomy, etc. London, 1851, 9.

‡ Lectures on Pathology. London, 1850, 67.

§ Holmes' System of Surgery. Lond. i. 1860, 16. Mr. Simon is inclined to attribute the "extra-vascular" theory to Prochaska, as far back as 1778. We have already remarked that the French school, as represented by Bichat and Cuvier, has been accepted as the basis of our scheme. We are inclined to believe that interpretation of modern discovery by the generalization of writers antecedent to this time, may afford an illustration of what Lewes calls, in speaking of many discoveries which have presumedly been traced to Aristotle, of reading in ancient texts the thoughts of modern thinkers.

vessels, thus rendering the vessel as passive an agent as the orifice of a vessel in an animal with an interrupted circulation—such as a mollusc—where the blood corpuscles pour out into irregular tissue interspaces.

We see, therefore, that researches in natural science, more particularly in departments of minute anatomy, have been a source of inspiration to our pathologists.* At the same time (and it may be in consequence of the connection between the two), there is often evident in their writings a certain weakness of grasp. This we believe to be a result of a faulty method employed. They have taken note of nothing in man but his tissues, nothing in nature but her crude materials. They have studied the cell almost exhaustively, its anatomy, properties and history, but have failed to comprehend the significance of their aggregation; in a word, of the presence of plans in nature.

Cuvier founded, *par excellence*, an architectural system. He demonstrated the plan of the divine builder, and places "tissue" subservient to their erection. Histology he proves to be not so much a science as a division of a science. When it was said of her votaries that, after all their ministration, she could not claim through their labors a single law, it was ignorantly said. The laws of organic structure are to be found only in forms made up of histologic elements.

Let us glance for a moment at the plans or types of the animal kingdom. As defined by Cuvier, they are four in number, corresponding to the great divisions Vertebrata, Articulata, Mollusca and Radiata. In a large inferior group, the Protozoa, owing to the extreme simplicity of their organization, no plans have

* Did space permit, we might trace many theories of causation of special diseases to discoveries (more particularly by Mulder) in organic chemistry. "At the present day," says Henle, (General Pathology, Eng. Trans., 1853, 28.) "a theory is sure of instantaneous success in which the pathological process diverts from a hypothesis based upon the apparent or real increase of any one of the constituents of the blood, * * * since the mania to reduce the totality of symptoms to differences of quantity depends upon the same causes as the passion for systems in general."

been detected, yet we must conclude that here as elsewhere design is present.*

Now what is the exact value of these plans?

Maclise has said,† "there can be no more striking proof of the divinity of design than by such revelations as anatomical science everywhere reveals, viz., that every organ serves in most cases a double, and in many a triple, purpose in the animal economy."

We can in the same way postulate, without dogmatism, that there is a profound wisdom in the creation of a plan. Nothing, we agree, is created without a purpose. What may be the purpose, therefore, or the effect upon its relation to the individual, of the presence of a plan when it pronounces itself in an egg, fashions every stage of development, influences habit, and controls its functions as well as determines its shape? Certainly something so constant and deep-lying that we cannot but conclude that it also operates in conditions of disease.‡

Accepting the Socratic definition that disease is "disarrangement of the body," we will naturally expect to find that of two animals, each suffering from a 'disarrangement,' will agree or differ from one another as the original arrangement of their parts may be alike or unlike. Thus a disease of a vertebrate will vary in its characters from a disease of a mollusc, since the types of these two classes of animals are in themselves different.

A few examples may be given of what we conceive to be errors

* All the original Cuvierian plans have undergone modification, except that of the Vertebrata. The Articulata and Mollusca have by some been sub-divided, while the group of the Protozoa has been created from the Radiata. This is, for our purpose, immaterial. It is of the importance of bearing in mind the existence of plans we are discussing, and not of the number which may be observed in nature.

† Surgical Anatomy, Amer. edit. 1859, 10.

‡ Equally to the point are the aphorisms of Henle (q. v. supra): "Disease is a deviation from the type according to which organic beings develop themselves" (p. 109). "Type is the law which determines the form of natural bodies." "Disease is the manifestation of the typical forms under unusual conditions," (p. 115). "Development deviating from the destined aim is the pathological process," (p. 124).

of judgment, arising from misconception or ignorance of this, the true method of investigation.

One physiologist endeavors to throw light upon the problem of double embryo in the bird by mentioning the fact that in many molluscs four or five embryos may arise from within a single chorion, as in the sea-hare (*Aplysia*).* Another, speaking of the transposition of viscera in the human subject, finds analogy and fellowship in somewhat similar dispositions occurring in certain univalve molluscs.†

A third observer detects an abscess in an oyster—the presumed result of a process of inflammation, without, however, as we must conclude, any of the symptoms being present by which it is elsewhere recognized. The assertion is suggestive of an extreme improbability whether anything comparable to an inflammatory process *can* be observed within the Mollusca. There is, perhaps, a shade more reason in the assertion that within the dermoid cysts of the human ovary, with their contents of teeth and hair, we find an example, confined nominally to the Invertebrata, of a budding or germinating process, similar to that observed in certain worms or insects.‡ Much less probable, however, is the relation suggested by Paget, that certain forms of the cartilage cell met with in cartilaginous tumors from the human subject, "deviating from what is natural in its own species, conforms with that of a lower creature." Had this "lower creature" been a reptile, frog, fish, or any other animal within the Vertebrata instead of a cuttlefish (a mollusc) we would have been better satisfied with our author's conclusion.

Not only do unbridgeable intervals obtain between animals of different plans of construction, but between those of the same natural division they may be sufficiently marked to occasion doubts on the part of the observer, whether his conclusions may be properly applied to any other animal than the one immediately under notice. Thus, even within the well defined division of the Ver-

* Lewes' Sea-Side Studies.

† Baukart, Pye, Smith and Phillips. Guy's Hosp. Rep. 1869.

‡ S. J. A. Salter. Holmes' System of Surgery, vol. iv. 32, note.

tebrata, the aquatic forms have lives differing from the air-breathing from the earliest stage of egg life. Any attempt to explain processes going on in the latter by studies carried on in the former may be open to objection.

Let us examine the common frog so generally employed in experimentation. The egg and tadpole conditions of this animal are aquatic. It is, therefore, without amnion or allantois. It aerates, when adult, through the common integument. It possesses a lymphatic circulation of great proportionate development, while it has a mixed cold blood. May not the intricate processes of inflammation differ in some essential feature from the same as witnessed in a warm-blooded animal? Is it rational to expect to find in a creature adapted to habits all of which would be fatal to man, the conditions favorable for experiments, the object of which is to explain processes going on within his own tissues? The single observation of Paget on the action of an irritant on the outstretched wing of a bat proved, we think, for the first time, the conclusions with respect to the change in the disposition and behavior of blood corpuscles in an irritated area.* Cohnheim has taken the frog for experimentation. His results are interesting as a study in comparative pathology, but they can not, we believe, have more than a suggestive value. Until they have been confirmed in the bat or some other animal, their application to mammalian pathology—even in the absence of Professor Balogh's observation—the verdict should have been given, as in every other instance—not proven.†

We can now understand why Waller's experiments fell stillborn, while Cohnheim's attained an early notoriety. The average mind of the profession was not prepared to accept, in 1846, what seems correct enough in 1869. White corpuscles were then less

* Wharton Jones' original studies were made upon cold blooded animals in 1849. Paget experimented on the bat in 1850. Apparently acknowledging his faulty method, the former observer repeated his labors, in 1853, upon warm blooded animals. His first memoir, however, appears to have been more frequently quoted than the last. See Medico-Chirurg. Trans. xxxvi. 391.

† It is but justice to state that Cohnheim also employed the rabbit in his investigations.

protean shapes than now, while it was rank heresy to dispute the specific quality of the mucus, pus, and salivary corpuscles. Much less was it believed that the blood held quite a little fauna and flora of its own, and that all that was necessary to prove the assertion was to look for the animals. A few years of such surroundings prepared the mind to notice a theory which appeared to harmonize with such increased knowledge of minute animals, and of actions of living matter.

Following up this train of reflection, it would be curious to speculate upon the different expressions theory may assume hereafter. No one can tell what that germ of thought may be now revealing itself to the mental gaze of the medical philosopher of the future, or in what way it will modify our present interpretations of nature. Of this, however, we feel assured, that if it do not conform to, or be in harmony with, the simple and grand truth of the presence of variety of design, not only in form but in function, it will not stand.

From The Pharmacist.

NITROPHENIC ACIDS.

BY JOSEPH HIRSH.

Ever since the discovery of the valuable antizymotic and disinfecting properties of carbolic acid, its production in the highest degree of purity has been aimed at, and, luckily, with signal effect. The good fortune of producing this substance perfectly pure does not consist in the sought-for acquisition of the *ne plus ultra* disinfectant which its final purity promised, but rather in the discovery, that its accompanying sister alcohols of the cresylic and xylic series, rejected so far as worthless, cumbersome appendages, possess superior antizymotic qualities, and the numerous good results ascribed to the use of carbolic acid were in reality due to the presence of the other alcohols mentioned, which even to-day may be found in the bulk of the carbolic acid in market, of which the perfectly pure fills only a portion. In practice, the dark, impure creosote was preferred to the light-

colored, even before the above constituents of the same had been thoroughly studied: experience having demonstrated the result, not yet viewed by the light of science.

Of equal date with the birthday of the fame of carbolic acid as a disinfectant, are the last honors paid to chlorine, nitric acid, and their compounds for the same purpose: and they are only employed where their low price is an offset, though a questionable one, to the use of phenic acid. It has even been stated that, as a disinfectant, carbolic acid and the mineral acids mentioned should never be used jointly: the suggestion having been made, *a priori*, from the consideration that in such a union the carbolic acid would lose its individuality. This reasoning was correct, but it lacked the basis of experiments to prove that the resulting compound did not produce the azymotic effects of carbolic acid to a considerable extent.

Having last year experimented on the *modus operandi* of carbolic acid (a brief review of the experiments having been published in the April number of the *Chemical News*), I instituted a series of similar experiments with binitrophenic acid, determining the comparative amount and rapidity of coagulation of albumen from different sources, with the acid in various degrees of dilution. A solution of the acid in ten thousand parts of water produced in blood-serum yet a coherent film of coagulum, while the same solution of carbolic acid produced only turbidity, the turbid liquid passing through a filter.

If the property to coagulate albumen is taken as the *modus operandi* of carbolic acid, against which suggestion no serious objection seems to have been raised, the production of the same result by another substance should recommend the latter for the same purpose. The nitrophenic acid seems not only to coagulate albumen readily, but in a dilution of 1-100,000 it produces that loose, cloudy coagulum which carbolic acid shows in a solution of ten times greater concentration.

To test its effect upon the lower classes of animal life, a tub (half a barrel) was set aside for a few days, in a warm room, its bottom covered an inch high with blood. The decomposition of the latter had progressed so far that the sides of the tub were

literally covered with white maggots, some of them measuring five-eighths of an inch in length, and one-thirty-second of an inch in diameter at their thickest extremity, that of the head. The countless smaller ones showed, by the billow-like motion of the whole mass, that they were full of life and vigor, and of promise of increase. A solution of one per cent. of nitrophenic acid was brushed on the inside of the tub, in the evening, very carefully. This did not seem to disturb the good humor and activity of the creatures, for they moved along as lively as ever. But the next morning the sides of the tub were perfectly clean, the worms having retreated to the centre of the tub, where they all lay dead, in one heap, in the blood. After the lapse of some weeks the same blood showed no sign of renewed life, nor the unpleasant odor of decomposing animal matter. The preparation used was the binitrophenic acid, prepared from the crude carbolic acid. It possessed the aromatic, pleasant odor, reminding faintly of nirobensol, and due probably to the presence of this substance in minute quantity. This pleasant odor is certainly a valuable property of a disinfectant, when we consider how sensitive many persons are to the odor of even the pure carbolic acid, and how much more they abhor that of the impure, often surcharged with hydric sulphide. A disadvantage to the nitrophenic acid is its color; but, as it can be used in much greater solutions than the carbolic acid, this ought hardly to be objectionable, especially as in many preparations habit has befriended us with dark color, which then we rather like. The agreeable odor is especially and perhaps only present if the preparation is made from the impure carbolic acid, which also has the advantage of economy.

Although the above experiments refer only to the binitrophenic acid, I do not hesitate to assume the same superiority for the other nitro-compounds. We have the trinitrophenic or picric acid, the value of which in malarious fevers has often been tested, and ranked with that of quinia. The temporary yellowness, which it imparts to the skin, renders it an undesirable substitute for quinia. Perhaps in many instances it has failed to give relief, but the same objection has been made to quinia. The

chlorophenic and sulphophenic may, by analogy, be expected to act with more energy than carbolic acid; but I reserve remarks on the same until I have finished my remarks in this direction.

Operative and Surgical Dentistry.

FRACTURE FROM MASTICATION.

Dr. Blake, of this city, not long since, handed me an under second molar, split entirely open antero-posteriorly from the crown down to the central length of the roots, exposing the pulp cavity and root canals complete. He extracted the tooth from an adult, who had split the tooth in mastication, having gotten a cherry stone between the teeth. The tooth showed a deep natural fissure where it split, from one approximal surface to another. In some cases, it would be very proper to endeavor to save the tooth by placing a rubber ring around it to keep the parts together, and treat the pulp for inflammation. Even if separation, complete, had taken place between the parts, the pulp might be destroyed and removed, and the dislocated portion placed back and retained by two gold bolts through the tooth. In such a case I would put the parts in apposition, and retain temporarily with a rubber ring. Then drill two holes for my gold bolts, having a small rivet head on the lingual surface, and a screw cut on the buccal end. The bolts being prepared, with nuts to fit the screw ends, remove the ring, and place a small quantity of thin osteo-plastic on the fractured surfaces of the tooth, replace the latter, fasten with the rubber ring, and then, at your leisure, secure the tooth firmly with the gold bolts. A little osteo-plastic should be placed under the rivet heads and the nuts, to secure that portion of the tooth from decay; and a slight quantity, or enough to make the drilled holes through the

dentos air-tight, should be placed in the drilled holes before the bolts are run through. After this, the crevice on the masticating surface of the tooth may be widened, dovetail slots cut across it, and plugged with adhesive gold, making the tooth still more secure from decay and fracture. C.

FINISHING PLUGS.

By Edgar Park, D. D. S.

To be *susceptible* of being perfectly finished, a plug must have been *skillfully introduced* into a *properly prepared cavity*.

Upon these two steps in the operation of filling a tooth depend almost entirely the beauty of a plug. These having been skillfully accomplished, the novice may perfectly polish, while the most skillful would fail in an attempt to produce an appearance of perfection upon an operation in which the cavity had been improperly prepared and the filling imperfectly introduced.

To produce perfectly finished and beautiful plugs, then, it is necessary to conceive the *design*, and with reference to which to perform the operation.

Finish the preparation of the cavity under a strong magnifying glass, polishing the margin with delicate files, burrs, or such instrument as may be most practicable in a given case, until no imperfection can be detected.

In introducing the gold adapt it to the *walls*, and impact *perfectly* as the operation progresses, using sharply but not deeply serrated pluggers.

In completing the introduction of the gold have in view the designed result, fashioning the filling with the plugger as nearly as possible. By the use of the lightly serrated plugger, with a *very slight* excess of gold a perfect surface may be exposed, while the deeply serrated instrument produces innumerable minute pits throughout the plug to mar the perfection of the operation. True, they may be concealed for the time being, owing to the malleability of the metal, by the use of the burnisher;

but when the burnished surface is worn off, the pits are again exposed. The instrument recommended, in skillful hands, produces a plug very nearly finished, owing to the solidity and contour secured.

To expose the perfect surface the usual instruments are used until the margins of the operation are clearly defined. To remove any marks left by the file or burr, finely pulverized pumice is an efficient agent, and chalk and alcohol perhaps the most satisfactory with which to produce a perfectly polished surface.

From the Pacific Medical and Surgical Journal.

NEW OPERATION IN DENTAL SCIENCE.

Reported by Q. L. Adams, D. D. S.

An operation was performed in this city during the months of May and June, 1869, by Dr. C. E. Blake, assisted by me, which is new in dentistry, and a description of which will be of interest to those in pursuit of dental science.

The gentleman upon whom the operation was performed, had been wearing a superior denture of artificial teeth, and having worn the remaining inferior teeth very much away, nearly to the margin of the gums, the four first inferior molars and second right bicuspid having been removed several years previously, the remaining portions of the dens sapientiæ had been forced very much forward.

May 13th. Applied the spray of sul. ether to the left dens sapientiæ, and when sufficiently benumbed, cut into the cavity, which was but a slight distance, and extirpated the nerve with small barbed broaches, designed for the operation, the sensation of pain being very slight. Owing to business engagements, the case remained under attention.

May 20. After preparing and cutting threads with a screw top, inserted two screws of pure gold three-eighths of an inch in length, and one-eighth of an inch in diameter. As the posterior root extended back, the back screw had to be fitted in first, and

curved, to bring the upper ends of the two parallel, where the threads of the screws had been removed, and the two adjusted, filling up the threads and remaining space with Robert's Os-artificiel. The amount required was very little, as the screws nearly filled the orifice.

After the operation came a plate of pure gold, in thickness about twenty-nine by gauge, and one sixteenth of an inch larger than the grinding surface of the tooth. Two openings were made in close proximity. The grinding surface of the tooth had worn down a little concave and uneven; the gold plate was therefore put on and tapped down with instruments and mallet, to fit the surface perfectly by annealing it up, and a hard plate for service, composed of platina and gold, one-eighth of an inch in thickness and nearly the size of the tooth, fitted to the first plate, with the opening deeply counter-sunk around the ends of the screws. They were then taken off, and the two plates soldered together. There was then placed on the under surface of the thin plate, and of the same size, sixteen layers of gold foil, so as to make the adaptation impervious to the fluids of the mouth. The sharp corners of the tooth were then slightly taken off, in order to make a better fit, and to avoid any small fracture of the corners in the adaptation.

Everything now being ready and the usual precaution made to keep it dry, the compound plate or cap was put on in its place, and the upper ends of the gold screws were riveted down with the serrated gold pluggers, and by the use of the mallet: and the remaining part of the counter-sunk cavity was filled with gold foil and sponge gold all solid and tight. The extended margin of the gold plate, and the foil underneath were then tamped down around the corner of the tooth. The perfect manner in which the plate of pure gold was tapped over and around the margin of the tooth, leaves no doubt of its security. About eight hours were consumed in the last operation.

May 24th. The corresponding molar on the right side was taken in hand, and the nerve-pulp extirpated.

May 28th. A successful operation was performed similar to the first. Subsequently, three bicuspids, and one canine were

treated and capped in the same manner, with the exception that but one screw was inserted in each fang—in some of which, gold foil was plugged around the screws in the fang to secure a perfect fastening.

On completion of these operations as above described, there was not any uneasiness or pain experienced by the patient, except in the first bicuspid on the right side, which had been treated for alveolar abscess eight years previously, and was quite sensitive and painful during the operation, but yielded readily by the application of an astringent wash, and in a few days was restored to its former tone of health.

The crowns of several of these teeth, some eight months previously, had been built up solid by the use of the mallet, with adhesive gold; but after a few months' use it was discovered that they were rapidly wearing away, caused by the grinding force and hard surface of the artificial teeth coming in contact with the pure gold. This suggested the operation of capping with hard metal as the most permanent manner of prolonging their use.

The above operations being new in the practice of dentistry, and having taken an interest in their performance, I take the liberty to give them the name of Compound Cap Restoration.

FILLING TEETH.

By H. Judd, M D.

(*Continued from page* 407.)

Gold foil ranging from four to six grains to the sheet had been most generally preferred for a good many years, but the last few years seemed to develop a *penchant* for lower numbers, and No. 2 was fast becoming a favorite, when some operators suddenly conceived the idea of again returning to much higher numbers, as had been tried before by Arthur some years ago, and at the Saratoga meeting of the American Association, Dr. Atkinson advocated the use of No. 14 or even 20, and Dr. McKel-

lops, of this city, is now using No. 30 and speaks highly of it, especially in large cavities. No. 2, in my hands, works more easily and kindly than any other that I have yet used. The method of preparing gold foil for use, depends on circumstances which are determined by the way in which the operator proposes to accomplish his design. If he is to make a filling with cylinders the sheet of gold is cut into two or four strips of equal size, or, if the cavity be large, a whole sheet or even two sheets are folded and rolled into one cylinder, the width of the fold to be determined by the depth of the cavity to be filled. The cylinders should be rolled upon a smooth truncated broach, or a broken excavator can easily be made into an instrument by filing down about one line and a half of the broken end, so that it will be about the size of a common broach, half an inch from the point. The cylinders should be for the most part loosely rolled, with the exception of some of the smaller sizes which should be rolled hard to be used in finishing up the plug. Cylinders should only be used in favorable cavities; that is, in those cavities of considerable depth, and which are so shaped that they can be easily retained. Blocks of soft foil are much used by some good operators, made by folding the foil into such shape as the shape of the cavity may require. These are placed in the cavity so as to line the margins, when the rest is generally filled with adhesive foil. The heavy foil, such as numbers ranging from fourteen to thirty, are prepared mostly by cutting the sheets into small squares or parallelograms, and these are packed from the bottom of the cavity by placing them smoothly upon one another, and welding the successive layers with a serrated plugger. The plastic and crystalline forms of gold need no preparation only to separate carefully from the mass small pieces from the size of a pin's head to that of a small pea, when it is ready for use. But by far the most common method of preparing adhesive foil for use is by rolling one-fourth, or one-half, or even a whole sheet of foil into a loose rope, and cutting this into pieces from one-fourth to one-half an inch long. Some use the rope without cutting, commencing at one end and packing it in successive layers, but there is one great objection to this, which arises from the lia-

bility of moisture from the breath accumulating upon the rope before it is all used up, and impairing its adhesive qualities.

Others, again, tear off a small piece from a leaf of foil, and carefully fold it with a small pair of pliers into a square pellet, contending that in rolling into ropes and cutting into pellets the foil is hardened at the line of section, and that it does not work as kindly as it does when the cutting is avoided. This is theoretically correct, but in practice the difference is scarcely perceptible, and will scarcely compensate for the extra amount of labor required for its preparation. Again, it is contended that the fingers should not come in contact with the foil whilst rolling it into ropes, and a very simple machine for rolling has been invented, which answers the purpose very well, and no valid objection can be made to its use; indeed ropes are more uniformly rolled, as a general thing, by using it than by rolling it with the fingers, but it is by no means indispensable, and the objection made to rolling it with the fingers, based upon the supposition that its adhesive qualities will be injured by the sebaceous matter which it will gather by its contact with the skin, will not prove to be a very strong one if the foil be carefully annealed as it is used, the annealing process pretty effectually cleansing it from the secretion of the sebaceous glands.

(*To be Continued.*)

PIVOT TEETH.

MESSRS. EDITORS:—

I notice in the August number of the JOURNAL, page 365, a communication from the pen of J. B. Bean, M.D., upon "Pivot Teeth." It gives me much pleasure to see that this subject is being once again brought before the profession with a prospect of a fair degree of notice.

The time has been when a pivot tooth and the ability to well plant one received quite a share of honorable credit. But for the last ten or fifteen years a great neglect of this variety of work has prevailed. And indeed, we can frequently meet den-

tists who say they never use pivot teeth, or plant artificial crowns upon the natural roots.

Several causes have contributed to this. Amongst the most prominent is that of cheap dental plates, introduced by the use of rubber. Another is the use of adhesive gold in building out large portions or entire crowns of front teeth. The first of these causes, good and efficient operators will not be influenced by. But the second will require a little more persuasion to obtain an acknowledgement from many, that a porcelain tooth, planted with pivot, ought to be preferred to a gold crown in the front part of the mouth. Of course, no rule can be brought to bear in determining the true relative value of the two modes, as much of the objection rests with the damage the yellow glaring metal has upon the physiognomy of the patient: and which is very much modified in effect by the amount the person exposes the teeth. But all must admit at once, in beholding one of these grinning subjects with a large yellow advertiser in his front teeth, the immense injury done to his natural expression. He strikes you at once as being very proud of the show of jewelry (whether worn in proper place or not) or being rather easily persuaded to be a walking advertiser for his operator.

No one will be likely to deny that a front root sufficiently healthy to bear filling from the apex (with mallet pressure) will, if properly done, equally sustain a pivot tooth. And how immeasurably more preferable would the porcelain tooth be than the mass of gold.

The third cause, that it is difficult to obtain good pivot teeth (though true) ought not to bear weight in this matter, as the want will most assuredly be supplied by our manufacturers so soon as evidence of their want is made known.

I have tried quite a variety of modes for planting these teeth. However I have never placed a gold tube in by filling around with gold foil, nor have I fitted a gold pivot to permit daily removal, by the patient, as recommended by Dr. Bean. At present, I think I see no especial advantage in these features. The filling around the tube to secure it must necessarily reduce the strength of the root just where it is the most liable of being split

in hard biting. And, if the tooth may be removed *ad libitum* by the patient, it is almost absolutely certain that from negligence or otherwise the tooth will be lost, or may be swallowed with the food.

After trying various plans for the use of metal tubes and pivots, I have finally adopted the non-metalic mode and abandoned all others, except where the root is too much out of range, or where much decay has reduced materially the dentinal strength.

My favorite mode after the road is prepared with the excising forceps, file and drill, is to proceed at once to fit a crown mounted upon a temporary pivot made of pine wood.

If a nerve is to be removed, cover it with a little wax, and congeal with atomizing spray and extirpate to the apex. Wipe out and apply a small dossil of cotton wool saturated with creosote with a blunt broach up out of the way of the drill. Then drill first with a conical, and next with a square point, to little more than two lines in depth. Then select a tooth of proper size, shade and form. Also, with correct pivot hole to correspond with the root. This latter is best done by placing a piece of pine or match stick in as a trial pivot. Now, if all is favorable so far, grind the base to fit truly upon the base of the root. To do this, it is a good plan to file with the same convex surface used to file the base of the root, a concave notch in a piece of wood, and, by a little experience a good fit is secured by repeated trials to this surface. Then again try on root with pine trial pivot, and see that position, length, &c., are all right. Now cleanse out the canal, which has most likely ceased bleeding from the apex, and place again cotton and creosote in the apex of the root, and plant the tooth upon a pine pivot.

This pivot is prepared by drawing a good piece of white pine through the graded holes of a draw plate until sufficiently condensed. The patient is dismissed for a fortnight or more, with the injunction that if pain or swelling ensue, to return at once.

If upon the return all is going on aright, remove the tooth, clean the canal, and place a dossil of cotton or bibulous paper

with creosote well pacted into the apex, whether the nerve has recently been removed, or has long since been dead. And over this pack oxychloride zinc, and when sufficiently hard, cleanse out the pivot hole to the proper depth, and replant the tooth with permanent hickory pivot.

To insure success, and the best possible results, every part must be properly adjusted, and the root must be in a good state of health, and the patient enjoying a good constitutionality.

A single pivot tooth, aided by natural teeth upon either side, of course does best. However, I have a few patients who have four to six pivot teeth placed continuously on the front superior roots which have been in service over seven years, and but one or two of the pivots have required renewing.

I have, also, in a few cases engrafted successfully with wood pivot upon the root of the first bicuspid. This root when cylindrical and favorably situated, will bear pivoting. The porcelain canine tooth will be more readily ground in shape for this purpose.

I insist that the profession pay more regard to this variety of artificial teeth. They are the most useful, natural and beautiful.

J. Hardman.

Muscatine, Iowa, Sept. 4, 1869.

(*From the Medical Investigator.*)

REMOVAL OF ONE HALF OF THE INFERIOR MAXILLARY FOR OSTEO-SARCOMA.

By S. R. Beckwith, M. D.

Mrs. B——, aged thirty-six, observed, some three years before I became acquainted with her case, a small tumor on the outer portion of the lower jaw, about mid-way between the symphysis and angle. It soon increased in size; at times was painful. Her physician was consulted, and treated her for six months. During his treatment the growth was slowly yet steadily increasing, until he advised removal as the only successful treatment. She

would not consent, and did not again apply for treatment, preferring to let it grow uninterrupted, until it had filled the cavity of the mouth and very largely distended the cheek. For months she had not been able to take any solid food, from inability to masticate, and want of room for the introduction of food. Her nourishment was fluids taken through a tube. She had become excessively emaciated, and fearing that she would soon die, was induced to visit me. From the absence of any marked constitutional disturbance during its early growth, and its large size, the sensation of firmness being less than in exostosis or osteoma, with the peculiar crackling sensation noticed when firmly pressed upon, gave me no difficulty in diagnosing it to be a case of osteo-sarcoma, and I advised resection and disarticulation of one half of the lower jaw. She readily consented, as her mind had been made up before leaving home that an operation would be necessary, and came prepared.

She was taken before the class, and with the assistance of Drs. Morrill and Bissell, it was removed in the following manner: The patient was seated in a chair, with her head thrown back, and held by an assistant. After the administering of chloroform, an incision was made along the base of the jaw, from the angle to a short distance beyond the symphysis, and a vertical cut, extending from the termination of the first to the angle of the lips. The flaps were dissected above and below, freely exposing the tumor. The jaw was divided about one inch from the centre, toward the sound side, as the disease had extended beyond the symphysis. The patient was now allowed to become conscious, for fear of strangulation, by blood flowing into the trachea during the balance of the operation.

Her strength was very much exhausted, and we gave her freely of brandy, and allowed her to lie down for a short time, until she expressed a desire to have us proceed. A cord was fastened around the jaw, and forcibly drawing it outwards, the attachments were divided, with a strong scalpel, to the angle. The bone was now drawn outwards and forwards, putting its upper attachments on the stretch as much as possible. A bistoury was inserted behind the coronoid process, just below the zygomatic

arch, and the temporal muscle was divided at its insertion. The jaw was now depressed, and disarticulating the condyloid process, it was drawn forwards with force, so as to remove it from the artery. The capsular ligament and pterygoid muscles were separated, and the jaw was freed entirely, save some slight attachments of the mouth, near the angle, that had not been reached before. Very little blood was lost during the operation, and but few ligaments applied to bleeding vessels. The wound was closed by a few wire sutures, and straps applied between them; pledgets of lint, wet with a weak solution of *Calendula*, were applied to the wound, and held in position by simply a handkerchief.

The patient remained under our care three weeks, and then returned home. The wound healed almost its entire course by the first intention, and there were no untoward symptoms during the convalescence. Great care and attention were given the patient for the first few days after the operation, to prevent sinking, although she had no symptoms of dangerous exhaustion, but these were feared from her feeble condition prior to the resection.

Three years after the operation I saw the patient, and the deformity was not as great as I had anticipated. In place of the bone, a fibrinous deposit had filled up the gap in such a manner as to tolerably well preserve the contour of the face, and she was in good health.

AMALGAMS.

Very little amalgam is used by the best classes of operators in large towns, and such is the case in St. Louis. I have had occasion to put in fillings of this kind for only two or three patients in the last two years. There is no necessity for its use except in the inability of the patient to pay for gold, or the incapacity of the operator. It would be well if its use could be dispensed with both in city and country, for it does, undoubtedly, in many cases, affect the health of the patient, and in other cases seriously affects the integrity of the teeth themselves.

It does harm in another way, namely: by rendering the use of gold and gold manipulating instruments, unfamiliar to the operator who employs amalgam extensively. It lowers the standard of operative ability in those who are capable of better things.

However, amalgam has been many years in use, and undoubtedly will be used many years longer, and it is important that the best should be used. There may be but little difference between the different amalgams, so far as their useful properties are concerned.

The writer, while having a country practice, was quite well satisfied with Lawrence's and Hardman's. The latter may not have as extensive sale as the former, but it is doubtless quite as good if not superior. Hardman's amalgam has one superior advantage over many of these compositions, in that it keeps its original silver color remarkably well. The writer saw lately several plugs which were put six years ago, of Hardman's amalgam, which had retained their color, their integrity of surface and margins, and the teeth perfectly preserved. C.

EXCAVATORS.

I have lately received some very beautifully made excavators and crescent drills, from the manufactory of J. D. Chevalier, N. Y. They are delicately made, and tempered exactly right. A delicate blade should have a delicate neck to it, otherwise it is clumsy and cannot be used where a delicate blade is needed.

This lot of excavators is the finest I have ever seen, and my friends seem to think so, too, for nearly the whole lot (twelve dozen) have been gobbled up by them.

The crescent drill is one which I had the pleasure of introducing to the profession.

No other form of drill cuts as boldly and rapidly as this. It is invaluable in cutting through the enamel, and in making retaining points. They are very effectual also, as chisels. They are easily sharpened, and good until the blade is worn up.

Speaking of Chevalier, reminds me that I have a pair of forceps which he made for me in 1844, and which are now in good order, although they have been in constant use ever since. C.

Mechanical and Miscellaneous Department.

REPAIRING ARTIFICIAL WORK.

(*Continued from Page* 424.)

Case No. 2. Full upper set on gold; style of work same as No. 1. One incisor loose. The lining and the tooth perfect, except that the rivets are both broken off even with the lingual surface of the tooth. This case is quite as easily repaired as the preceding one, and so perfectly as to leave no trace of the accident, by re-attaching the loose tooth instead of selecting and fitting a new one, a matter always attended with more or less difficulty, especially to the dentist away from our large cities, where he has not the advantage of a large assortment of teeth from which to select a tooth to suit the case. The new attachment, by means of a strip of platinum or gold plate soldered fast to the ends of the broken rivets in the tooth, is secured in the following manner:

The rivets are first dressed down even with the surface of the tooth, or till a plain surface the full size of the rivets is obtained. If, as is sometimes the case, the fracture be a little below the surface, the ends of the rivets should be brought up even with it by grinding a channel on the tooth in a line with the rivets. The edge of a strip of platinum or gold, as thick as the diameter of the rivets, one-eighth of one inch in width, and about one and a half inches in length, is placed in contact with the ends of the rivets, the one end of the strip being even with the cutting edge of the tooth, the other extending beyond the end of the gum, and retained there by means of a little wax, shellac or gutta percha. The tooth is now to be placed in an investment made of equal parts of plaster and sand, or marble dust. Mix about a tablespoonful of the investment and place it upon a piece of glass or paper, and imbed the tooth in it, with the labial surface down, leaving the lingual surface exposed, and letting the invest-

ment cover entirely the end of the strip protruding beyond the gum, thus securing firmly the edge of the strip in contact with the ends of the rivets while being soldered. When the investment is sufficiently hard, remove the wax or shellac, apply a little borax and heat up the case very slowly over a spirit lamp or a charcoal fire. When nearly hot enough to flow the solder, finish the operation of soldering with the blow pipe, using as little solder as possible: cool it off gradually; when cold, remove the investment and boil the tooth in dilute sulphuric acid to remove the borax left from soldering. Cut off the long end of the strip even with the upper side of the upper rivet. With a small saw or separating file saw a slit in the lining on a line with the old rivets up to the upper side of the upper rivet. Place the tooth in position, the strip passing through the slit made in the lining: with a pointed instrument indicate the thickness and length of the lining on the strip by drawing a line even with the surface and terminating at the edge of the lining: remove the tooth and trim the strip to this line, replace it, place the case in an investment of plaster and sand, and proceed as usual to solder the tooth fast. When completed, dress off and polish in the usual manner. The result will be highly satisfactory if the process be properly conducted.

Case No. 3 is the same as case No. 2, except that the lining has given way, leaving a portion or the whole of it attached to the tooth. Nothing is needed in this case but to re-unite the parts by soldering them. The only special care to be taken in this case, (and the same care should be observed in all cases of repairing where the process of soldering has to be resorted to,) is to have the case perfectly clean, to heat it up slowly and evenly, and to have it nearly hot enough to flow the solder before applying the blow pipe flame. When sufficiently hot, the reducing flame may be thrown at once on any portion of the case without any danger of breaking or cracking the teeth, and the solder flows much more readily and satisfactorily than if the case be taken from the fire too soon, and the heat brought up with the blow pipe. The case should be cleansed by boiling it in a strong solution of soda or potash. To avoid trouble which may

arise from the solder not flowing as desired, the parts or surfaces to be united should be cleaned by scraping; especially if there be much solder on the case, or if the plate be poor, the object being to conduct the process as rapidly as possible, as a long continued heat injures a plate of this character, the old solder being oxidized, thus rendering it brittle, the surface presenting a shriveled and unsightly appearance. Generally in cases of this kind the lining is very thin, so thin that any attempt at uniting the parts by means of soldering will result in the melting of the thin portions of it. To avoid this, lay over the lining a thin piece of plate of the same size, well covered with borax; place the solder in *small* pieces around the edges; hold the case in an inclined position, so that the covering may not be thrown out of place, and flow the solder. Use as little solder as possible in all cases, and never attempt to fill a hole or crack in the lining with solder; always fill them as nearly as may be with pieces of plate or bits of gold foil. E.

(*To be Continued.*)

ARE RUBBER PLATES INJURIOUS TO HEALTH?

At the present time the use of rubber for dental purposes has become so extended that the above inquiry has become one of much importance. If it is true, as asserted by some, that these plates are actually injurious to health, it is at once manifest that the practice of inserting teeth upon rubber base should be at once condemned. The experience of the last ten years has undoubtedly thrown some light upon this inquiry, but the profession has been exceedingly slow in arriving at an adverse conclusion upon this subject, inasmuch as a great majority are bound by pecuniary considerations to uphold the use of rubber. But the facts that have been slowly accumulating, are finally having their influence, and at this time, a majority of the best members of the profession are discouraging its use. A short résumé of the facts elicited by an examination of this subject may be of interest. It was first observed that in a certain proportion of cases the rubber plate

produced an irritation, and, in a smaller proportion, an active inflammation of the mucous membranes with which it came in contact. Statistics are wanting to establish the exact proportion of cases in which these marked effects were produced, but it is certain that they frequently occurred. Perhaps one case in ten shows some slight irritation, and one in twenty passes on to active inflammation, and it is possible, that if closely examined, a considerably larger proportion than this would be visibly affected. Be the proportion what it may, the facts that these results are frequent, is established, beyond all controversy, by the testimony of the best men in the profession. My own observations only accord with those of others in this respect, and it is a matter of regret that a record of more of the cases that have fallen under my observation had not been kept, but a few of the most remarkable were noted down at the time, and among these I notice one which was observed about two years ago. The patient, a lady of about thirty years of age, dark complexion, bilious temperament, and in pretty good health, had an entire upper set inserted on vulcanized rubber, by a practitioner of this city, which she wore with little or no discomfort for six months, though upon examination it was found that the mucous membrane was red and injected with blood, though entirely unaccompanied by pain. This observation was made by accident, as the patient called only to have an operation performed upon a lower tooth. As such appearances had been frequently met with before, no particular attention was directed to it until some six months later the lady called the second time, complaining of some uneasiness in the vicinity of the horizontal plates of the palate bones. It was at this time that my attention was first called to the case by the practitioner who had it in charge. Examination showed ulceration of the soft tissues to the size of a dime, and a probe revealed the existence of a portion of necrosed bone about the size of a large pea. The whole mucous membrane, covered by the plate, was in an active state of inflammation. The necrosed bone was removed, and the patient directed to discontinue the use of the plate, after which the mouth soon became healthy, the hole closed in the course of a few weeks, a metal plate was substituted for the rubber one, and

several months afterwards the mouth was healthy and sound. Another case, of which I noted down the most important features, was brought to my office by a good operator of this city some eight months ago. The man was about forty years of age, nervous temperament, of strumous diathesis, and had been in poor general health for some time. A year before, he had had an entire upper set of teeth inserted on rubber, which he had worn without any discomfort at all till a week or two before, when, as he said, he thought something must be the matter with the roof of his mouth. Not, however, on account of any pain felt there, but because upon one or two occasions, when drinking water with his teeth out of his mouth, it seemed in "some way," as he expressed it, "to get into his nose." Upon examination, and from a history of the case, the following facts were elicited: The irritation produced passed on to inflammation, which extended to the periosteum, and finally to the bone, resulting in extensive necrosis of the palate processes of the maxillary bones, and involving a considerable portion of the vomer, but presenting to the eye, upon superficial examination, only the appearance of a phagedenic ulcer, about an inch and a half in length, and at the widest part, about three fourths of an inch wide. A silver probe, however, easily passed through in three or four places into the nose. In a few days the soft parts sloughed off entirely, and the remaining portions of the palate processes also, leaving a large opening from the mouth to the nose, the soft parts at the margin being uneven, ragged, and of a purplish color, and the bones at the margin of the opening being in a rough, necrosed condition.

Under the local treatment of carbolic acid and glycerine, one drachm of the former to one ounce of the latter, the extension of the ulceration and necrosis ceased, and in the course of five or six weeks the bony margins of the opening were covered over by healthy mucous membrane, and the mouth presented as healthy a condition as is usually seen after the hard palate has been destroyed, leaving a free communication between the oral and nasal cavities. This, it is true, is an extreme case, but I have seen two cases in the past week that are by no means uncommon. One, a lady, has worn a rubber plate for one year, and the mucous

membrane is swollen, red, and inflamed, the inflammation being limited by the margins of the plate. In this case there has been a good deal of uneasiness, and at times, some pain manifested, but in the majority of cases there seems to be very little or no uneasiness or pain, even where the inflammation is severe. The other case was a gentleman who has worn an upper denture for about one year; complained of no pain, but, upon examination, inflammation extended as far as the plate reached, whilst in two or three other places large ulcers were present with discharge of pus and ichor. But these cases are now so common that it would be useless to enumerate more of them. Now we must acknowledge that, as a profession, we have been wanting in caution in encouraging the use of rubber without examining farther into its constituents, which, if we had done at first, would have, no doubt, sufficed to convince us of the danger of using it. Upon examination we find that vulcanite rubber base, that is, the common rubber base now in use so extensively, has more than one fourth of its whole weight made up of sulphur and sulphide of mercury, or as it is more familiarly known, the red sulphuret of mercury. This mercurial compound was a favorite medicine with some medical practitioners some years ago, and was used by them when they wished to produce salivation more rapidly than could be brought about by other preparations of mercury. We presume that it will only be necessary to direct the attention of the more thoughtful members of the profession to these facts to cause them to substitute some other substance for bases for artificial teeth; and as several are now used which are safe in the mouth, and which require but little more labor and expense of material, this suggestion will probably soon be adopted by the great majority of careful practitioners who have any regard for the health of their patients, and who are anxious to preserve their own reputations. It might, perhaps, be inferred from the foregoing, that the use of rubber had not yet been discarded by any considerable portion of the dental fraternity, but this inference would be far from truth, for, as already stated, a majority of the best operators in the country have already cast it aside; but as many are yet using it, it seemed necessary to once more direct the at-

tention of such to this plain statement of facts, which we presume no one will pretend to deny, and which no one can controvert.

J.

MISSOURI STATE DENTAL ASSOCIATION.

Discussion following a Paper read by Prof. JUDD, on the Subject, "Ossification of Dental Pulp," published in the August No. of the JOURNAL.

(*Continued from Page* 422.)

Dr. Judd:—

I was in hopes I would hear more from different members of the Association on this subject—some of their experience in regard to this pathological condition. It is rather a new study for us all. It is a thing I have hitherto given little attention to, and it is a subject that has been but little discussed by the members of the profession, and so far as my observation goes, but little has been written upon it by members of the profession. We find here and there a slight mention of the occurrence of such conditions, but very little time, I think, has been spent in its investigation, and very little time in its discussion. Nevertheless, it is a subject of considerable practical importance too. We are well aware that in many instances we have an uneasiness or pain in the teeth which we cannot account for. We have a diseased condition, the diagnosis of which we are not able to make. Now, what little light has been thrown on this subject by the few cases that have been related here, I think, will be of some service in the future, and if they are placed on record and conned over by others, I am in hopes that finally we shall arrive at some definite results—at something that is tangible—in regard to this pathological condition that we now know so little about. The testimony that Dr. Chase added to what I said in the paper, relative to some of the signs or symptoms of this diseased condition, is valuable. I was in hopes we would accumulate more evidence upon this subject. In some cases there is an excessive hyperæsthesia, a degree of hyperæsthesia in some few cases that I have witnessed, that I have never seen under any other circumstances whatever. Now, if we can but establish the fact

that this excessive hyperæsthesia is one of the prominent symptoms of this disease, and that it is generally present, we shall have gained something over anything that I recollect to have seen in relation to this disease. This paper was written in very great haste, and embodied simply a portion of what I have observed myself, without looking up the literature of the dental profession upon this subject. Now, I may be wrong in my supposition that others have not stated this as one of the symptoms characterizing this disease, but I don't recollect of having seen it as a common symptom of the ossification of the dental pulp. I am perfectly well aware that when a man discusses these subjects, he should discuss them with the light of the past all before him. It is the business of one who writes upon any subject to take what light has been thrown over it from the past as a starting point, and then if it be possible to make any progress he has done something in the cause of science. I ought to have looked this thing up before I wrote this paper, but my time was so much occupied, it was impossible for me to do it. I say if we can establish this one fact here, it is my impression that we have gained something in our knowledge of the signs or symptoms of this disease. In the few cases I have seen, this hyperæsthesia has certainly been wonderfully marked; but the few cases we have observed are not sufficient to settle anything of this kind. It requires prolonged investigation before we can come to the conclusion that this is an inevitable symptom of calcification or ossification, and I hope that gentlemen will turn their attention to this subject a little more closely, and gather up, if possible, more facts in relation to it. We are not, however, it appears, entirely in the dark in relation to the etiology of calcification of the pulp. There are cases, and many cases, to which we cannot trace the causes; but there are some cases, and probably the majority of those that fall under our observation, in which we can, with almost unvarying certainty, say that the disease was produced by a mechanical irritation. I refer to those cases referred to in the paper, in which the teeth are worn off until they approach the pulp cavity, and in almost every case of that kind there is a reproduction,—a new production rather of dentine, secondary den-

tine, or of calcified substance—and we can, with almost unvarying certainty, say that this is the result of a mechanical irritation. There can be but very little question about that, because it so invariably follows this mechanical irritation of the pulp, from the wearing down of the crowns until they encroach upon the pulp cavity. Now, in some cases, I remarked before, we cannot find such irritation. There may be an irritation there. There may be, for aught we know, even inflammatory action there. But the facts stated above give us some light. We are not entirely in the dark. It shows us which way to look, in our efforts to find the causes of this pathological condition. Now I think that, in all probability, if we make observations enough, we may be enabled to see a difference in the visible signs, the external symptoms of exostosis and calcification of the pulp, and I think, probably, we shall find that in exostosis there is more of a constant uneasiness, while in the other condition there is this hyperæsthesial condition, which is usually brought into action by even the slightest irritation. I think, if we cultivate our powers of diagnosing these cases, that we may finally be enabled, perhaps, to diagnose this with considerable certainty, and I hope the members of the Association will gather up and store away the facts in relation to those cases that fall under their observation.

Dr. Kulp:—I would like to ask a question: Whether this abnormal condition has ever been found in delicate patients; whether it has not invariably been found in patients of full habit?

Dr. Judd:—In answer to the question I will state that the worst case I ever saw was a tooth removed from a gentleman who has been almost a vegetarian for 20 years, and who is anything in the world but a man of full habit. This was one of the worst cases I ever knew, in which the symptom I speak of was most clearly marked, the calcification extending through the root, nearly to the apex.

Dr. Peebles:—I will mention, in answer to the question of Dr. Kulp, two cases I regard as the most marked cases I ever met with. One was that of a lady of rather slender habit, rather delicate, and about 50 years of age; the other was in a young

man, say 25 or 30 years of age. He was tall and slim, and looked to me like a man who was not a large feeder. He was of a sanguine temperament. In both of these cases the entire pulp was calcified and hardened. One of them was an inferior molar, and the hardened process had passed down to a line and a half from the main pulp chamber in the anterior root. The other was a superior molar, that of a man, and I am not aware of its having passed into the root at all. I am quite positive about that.

Dr. Chase:—I would further remark, that I don't remember ever having a case of calcification under 35 years of age. I think I have never met with any person under that age, who was troubled in this respect; and I think a majority of the cases I have had were nearer 45 than any other,—in the vicinity of 45 years of age. I think these cases are more apt to occur in elderly than in younger people; and, also, we find the same to be the case, I think, in exostosis. Now in regard to the symptoms we have in this calcification of the pulp. When the calcification first commences, or the dentine first commences to form, then we may suppose it is confined principally to the pulp chamber. We have this hyperæsthesia, extreme sensibility to heat and cold, or pain from pressure on the tooth or jaws. These symptoms we have also in periostitis, and as the process continues and comes down nearer the apex of the root, then we have almost always the symptoms of periostitis. I speak of my experience, and we have here much the same symptoms that we have in pulpitis. We have then sensibility of the nerve pulp to heat or cold, as you will find by using a syringe with cold water, and you have this tenderness of the tooth. I have observed this in a number of cases.

Dr. Forbes:—The subject under consideration so seldom arises in the practice of an individual, that it is very difficult, with the keenest observation, to ascertain what are the symptoms that produce either exostosis or calcification of the pulp. I don't think it is confined to either age or sex or temperament. With nervo-bilious temperament, however, this trouble is more likely to occur, and those cases I have observed have been of that tem-

perament. I will merely relate one case of the extraction of a tooth, a nodule occupying, perhaps, seven-eighths of the main pulp chamber, what I call the pulp of the tooth. The dentine around it was, of course, not normal, but it hadn't disintegrated and become ordinary pus. In old age, when atrophy occurs on the wearing away of the tooth, I think nature provides for it by stimulating the internal parts and throwing out the ossific tissues, to make up for the deficiency; but it does not always follow, as somebody observes in his microscopic observations, that nature always does it. It is no doubt normal in this case, for in proportion as we grow old, our bones become not only firmer, but the pulp cavity diminishes in size. In the tooth of a person of a hundred years of age, the nerve chamber is almost entirely obliterated. It is difficult to ascertain the cause, and to diagnose what is the nature of the disease; and what little information the patient can give us on the subject does not add anything to it. I would relate that the patient I extracted the tooth from was about 30 years of age, and rather delicate than otherwise.

(To be Continued.)

[*From the Dental Cosmos.*]

PARTIAL SETS OF TEETH WITHOUT PLATE, CLASP, OR PIVOT.

By H. D. Bennett, Paris, France.

My attention has lately been called to a new method of inserting teeth. Where four or five are needed in various positions in the arch, they are all attached to a small bar of gold about midway between the point and base of the teeth, so that they may be very readily kept clean around the gums, and the two ends of the bar are plugged into the adjoining natural teeth, by means of a griffe. I have been shown a number of these cases by Dr. B. J. Bing, of this city, the originator of this novel method of inserting teeth, and in each case I have found the patients delighted.

The most difficult of these cases are the superior incisors; for example, if you wish to insert a central, a cavity must be made in the palatine depression of the adjoining central and also the

lateral, and one in the approximal surface of either of these teeth, about the place where we usually find decay on these surfaces. An impression is then taken which will show the cavities, and a gum or plain plate tooth carefully fitted and backed with gold, observing the precaution of allowing a small point of the backing to extend into the approximal cavity; two little griffes are then soldered to the base of the backing, the ends of which are carefully plugged into the palatine cavities, with gold foil, in such a manner as will tend to draw these teeth very slightly together, or at least not force them asunder, as might be the case were this precaution not taken.

When this operation is carefully performed for an intelligent patient, the result is always very gratifying, as none of the attachments can be seen without close scrutiny with a glass. It is solid, stationary, and can be cleaned as well in the mouth as the natural teeth, and simply demonstrates the fact that two roots will support three crowns. I have seen a number of these cases which have been in the mouth for nearly a year, and which are perfectly solid and clean,—as perfect as when first inserted.

STRENGTHENING LOWER RUBBER PLATES.

To have a plate brought back in two pieces instead of one, is to us dentists an annoyance of which we would gladly rid ourselves. For the benefit of those who may not know of a better plan, we suggest the following method of preventing the frequent occurrence of this affliction, by strengthening the plate. Fit to the lingual surface of the model, as nearly as possible, with a pair of pliers, a strip of gold plate $\frac{1}{4}$ to $\frac{3}{8}$ of one inch in width, of sufficient length to cover the weak points, and thick enough to receive well countersunk holes. These holes should be made at short intervals along the center of the strip, and be well countersunk on the lingual side. At either end of the strip, solder to the lingual surface a hook of the proper length and crook to hold the strip firmly in the counter matrix in the flask. In waxing up the case, place the gold slip in position on the lingual

surface of the wax, having previously warmed it sufficient to soften the wax, and press it gently into it, thus imbedding it in the model plate, leaving the lingual surface and the hooks exposed. Flask and pack in the ordinary manner. File off the hooks and finish as usual. The result will be a neat appearing, and very strong plate. NOW AND THEN.

ON THE USE OF THE CHLORIDE OF GOLD IN MICROSCOPY.

Perhaps no re-agent has, of late years, played so important a part in microscropy, as the chloride of gold. By means of it Cohnheim first demonstrated the terminations of the nerves in the cornea; and since, it has been very generally used, particularly in investigations of the nerves. Its application is very difficult, and it is only after a long series of experiments and failures that proficiency is obtained.

Having had considerable experience with this re-agent, in the laboratory of Professor Stricker, in Vienna, and having obtained some very satisfactory results, I hope that a few words on its application may not be out of place. The chloride should be dissolved in distilled water, and the solution should never be stronger than the half of one per cent. The object to be examined should be as fresh as possible, and should remain in the fluid from three minutes to perhaps an hour, according to its affinity for the re-agent, during which time it assumes a pale straw-color. If the piece be small enough to be readily acted upon, ten or fifteen minutes is almost always sufficient. It is then laid in distilled water, to which just enough acetic acid has been added to give it the faintest possible re-action. In two or three days it will have become purple, verging sometimes on blue, sometimes on red; the latter is the least favorable. The preparation is now enclosed in glycerine, and improves for several days, as the color becomes deeper, and as the finest fibres are the last to be affected. If the experiment has succeeded, for it sometimes unaccountably fails, the picture presented is one of the most beautiful and instructive that can be imagined. The nerves, muscular fibres and

fibrous tissues appear black on the purple background. Epithelial cells are also colored, but not so well as by nitrate of silver.

Although the color makes fibres visible which are so fine that they can be seen by no other method, it does not determine their character. To prove beyond all doubt that a minute fibre is a nerve, we must be able to follow it to a larger branch. On a very successful preparation of the cornea of a frog, I observed nerve fibres of such minuteness that, with a magnifying power of nearly two thousand diameters, it was impossible to follow them to their terminations. I particularly endeavored to verify the connection asserted by Kühne, but not generally accepted, between the nerves and the corneal corpuscles. With every advantage, such a connection is very difficult to prove. I often thought I had found one; but when examined by a higher power, and placed in different lights, it proved to be only apparent, except in a single instance, and then it was not certain that the fibre in question was a nerve. I mention these facts as proofs of the value of the method; for it is no paradox to say that the better the preparation, the more difficult it is to obtain results. As the magnifying power is increased, elements come into view which, by inferior methods, are never seen; and spaces are discovered between bodies supposed to be in connection. The use of the chloride of gold, however, is not yet thoroughly understood, and offers a large field for original investigation.—*T. Dwight, M.D., Boston Medical and Surgical Journal.*

BROOKLYN DENTAL SOCIETY.

This Society, organized under the name of the Brooklyn Society of Dental Science and Art, and since changed to the Brooklyn Dental Society, held its Second Annual Meeting at the residence of C. D. Cook, M. D., on Monday evening, Oct. 4th, 1869. Interesting reports from its various officers and committees were heard, after which the following dentists were elected officers for the ensuing year:

President—Dr. O. E. Hill.
Vice-President—Dr. M. E. Elmendorf.
Recording Secretary—Dr. E. L. Childs.
Corresponding Secretary—D. A. Brockway.
Treasurer—Dr. I. C. Monroe.

The reading of the Secretary's Report showed the Society to be in a flourishing condition. It has undertaken to establish a Dental Infirmary in Brooklyn, independent of any other institution, where the poor can receive gratuitous dental aid, and where the members of the Society and their students will have an opportunity of witnessing dental clinics.

At the close of the meeting, the company were entertained by the retiring President, Dr. Cook, to a feast of fat things for the inner individual, which only a Cook knows how to prepare. The membership of the Society embraces nearly fifty of the dentists of Brooklyn, and is a working and progressive institution.

E. L. CHILDS, *Rec. Sec.*

A convenient method of making the openings through the rubber dam, for its adaptation to the teeth, is by the use of a heated, pointed instrument. By means of this, openings may be melted through the dam accurately as to size and disposition.

P.

MORTALITY OF FIVE LARGE CITIES,

For September, 1869.

New Orleans, . .	population	200,000,	deaths	461.
Cincinnati, . . .	"	230,000,	"	297.
Boston, ...	"	240,000,	"	495.
Chicago, ...	"	252,000,	"	814.
St. Louis, . . .	"	240,000,	"	646.

These are official returns. C.

IOWA STATE DENTAL SOCIETY.

PROCEEDINGS OF THE SEVENTH ANNUAL SESSION.

The Seventh Annual Meeting of the Iowa State Dental Society took place in the rooms of Dr. W. O. Kulp, Muscatine, Wednesday, July 21, 1869.

The Society was called to order at 8:30 A. M., by the President, Dr. Ingersoll, of Keokuk.

The roll was called, and responded to by the following members:—

L. C. Ingersoll, Keokuk; H. S. Chase, St. Louis; I. P. Wilson, Burlington; N. H. Tulloss, Iowa City; P. T. Smith, Iowa City; R. D. Myers, Davenport; A. B. Mason, Waterloo; J. S. Nicholson, Independence; R. S. Rathburn, Lyons; J. S. Kulp, Newton; W. D. Taylor, Ft. Madison; Jos. Hardman, Muscatine; Wm. O. Kulp, Muscatine.

Dr. W. O. Kulp, Recording Secretary, read the minutes of the last meeting of the Society, which were approved.

The election of new members being in order the following names were proposed: Dr. Goble, of Dubuque; Dr. Minor, of Davenport; Dr. Gill, of McGregor; Dr. Gregg, of West Liberty; Dr. Chafee, of Muscatine; Dr. Dillingham, of West Liberty, and Dr. Bosart, of Wilton.

Drs. Mason, J. S. Kulp, and Wilson were appointed as a committee on examination.

The report of the Treasurer was made as follows:

IOWA STATE DENTAL SOCIETY,

To W. O. KULP, Treasurer, Dr.

For amount paid janitor at Keokuk,	$ 6 00
Dr. Tulloss' bill for printing, &c	9 53
	$15 53

Cr.

By amount in treasury	$ 3 66
By dues of 1868	30 00
	$33 66
	15 53
Amount in treasury	$18 13

WM. O. KULP, D.D.S., Treasurer.

The report was received and adopted.

The Committee on Legislation asked for further time.

Dr. W. O. Kulp moved that a committee of five be appointed to revise the constitution, by-laws, and list of membership of the Society, and have them published in pamphlet form. Carried.

The Chair appointed the following gentlemen as the committee: Drs. W. O. Kulp, Mason, Hardman, Myers, and Tulloss.

The Committee on Examination of applicants for membership made a report recommending for membership in the Society, Dr. M. D. Goble, of Dubuque; Dr. A. M. Minor, of Davenport; Dr. T. F. Chafee, of Muscatine; D. H. Gill, of McGregor; as junior members, Drs. A. C. Craig and E. H. Dillingham, of West Liberty.

The Society accepted the report of the Committee, and the new members signed the constitution.

The election of officers for the ensuing year being next in order, Dr. Wilson moved that an informal ballot be taken, and that the three receiving the highest number of votes for any office be voted upon by the Society. Carried.

The election resulted in the election of the following officers:

President—Dr. J. Hardman, of Muscatine.

Vice-President—Dr. Myers, of Davenport.

Recording Secretary and Treasurer—Dr. A. B. Mason, of Waterloo.

Corresponding Secretary—Dr. I. P. Wilson, of Burlington.

Dr. L. C. Ingersoll, President of the Society, on retiring from office, delivered the following address:

ADDRESS OF DR. INGERSOLL.

Gentlemen:—I have been thought worthy to be elected by you President of the Iowa State Dental Society. I should be untrue to the instincts of human nature, and to that self respect which is the panoply of human character if I did not feel gratification in the respect of my professional brethren, and take this occasion to express my appreciation of the honor conferred upon me, and your uniform courtesy and kindness.

You have made it my duty to prepare a formal address for your hearing at the expiration of my term of office. Such an address, pertaining to various interests of the profession, I offer at this time, trusting to have your thoughtful consideration of what I may present.

In a very proper sense this occasion is the anniversary of the organization of the Iowa State Dental Society. Here in Muscatine, seven years ago, it had its birth. Here it was fondled and caressed with paternal care. Among nurses and neighbors the babe was called good looking—*ill looking*; of noble blood and parentage, and *bastard*. It had to live, for no one dared kill so promising a child. In its infancy it passed the trying period of first dentition—had whooping cough, scarlet fever, mumps and measles—and was left with every sense and organ complete. *Then* the nurses knew that it was a robust child. The neighbors remarked upon its healthy look, and declared that it grew handsomer every day—so much like its parents!

Now that its infancy is past, and its youth so auspiciously entered upon, and relatives and friends in every part of the country greet it with most friendly regard, we may here rejoice in the child of our adoption and say, *Long Live the Iowa State Dental Society!* and may this sentiment find an echo wherever in our noble State is found a true and worthy dentist

This Society was not organized in the interest of a few individuals, but for the best interests of all members of the profession in the State.

An organization which can be made of so great good ought to be so made. That the meetings of this Society have been profitable, those who have attended from year to year will with one consent testify. It is possible that a professional brother might attend a single meeting and find very little to interest or profit him. But if the testimony referred to above can be relied upon, any practising dentist wishing to improve his practice, to increase the range of his operations, and to lessen his failures in the doubtful cases which he attempts, can gain the wished for end in no better way than to regularly share with his brethren the opportunities offered at the meetings of the Iowa State Dental Society.

So far as society organization is concerned, it should be the first object with every dentist who desires the advancement of the profession in science and skill, to join his brethren in making the State Society a power among us to secure the most desirable ends. Local societies have a mission of good in harmonizing local interests, and promoting friendly feeling. They should also be made tributaries to the State society. In no case should they be so organized or conducted as to divide and weaken the State society, but rather to add numbers and influence to it. There are questions brought before this Society for discussion and society action, all-important to the profession throughout the State. To secure the results aimed at we need the counsel and co-operation of the largest number.

The profession in some of the States have invoked legislation—and their prayer has been granted—to aid in the advancement of the interests of dentistry by expelling from their ranks those pretenders who ape professional dignity with a bold, boastful swagger, who mock science with blind eyes and blundering words, who use artifice and not art, and who practice with careless ease in attempting only the simplest operations, then steal from the skillful hands of other dentists those operations which their own unskilled hands could not perform; by stealing the condemned teeth from the mouths of their patients and burning or burying them out of sight. To make effective our action in such a matter we need a united front. But let us not think that protective laws can sift out of the profession charlatanry by expelling charlatans. Protective laws relating to dentistry are designed, on the one hand, to protect that great majority of the people in every community who are ignorant of dental operations in their manipulative minutiæ, and are unable to judge of the completeness of an operation in their mouths until the sad failure of an incompetent operator is re-

vealed in teeth utterly ruined, which might have been saved by a competent dentist. On the other hand, protective laws are invoked to stimulate those already in the profession, and those seeking it, to attain a high standard of excellence in their operations, and to merit public favor on the ground of their skill and the lasting and appreciable benefit their services are to mankind. If these two objects could be gained through the agency of legal enactments, both we and the communities in which we dwell might rejoice. The great majority in every community, from necessity and the habit of their lives, consider most truly good and excellent things as pecuniarily beyond their reach. To these, quackery recommends itself as being *notoriously cheap*.

Law might save some of these people by putting a quietus upon the operator provided he be *really a quack*. But the greatest troublers in our ranks are not these unskilled charlatans; their deeds soon find them out. We have a difficulty more perplexing in being brought into competition with a class of practitioners whose education and capabilities are superior to quackery, and who might, with a very little brushing up, pass the test of qualification before a legal board of examiners; but being men void of principle and every sentiment of honor, will condescend to the merest quackery, and the most dishonorable and dishonest practices, if by so doing they can get a dollar, that a man having proper respect for his own character as a dentist would never touch.

Such operators, caring not to excel in their operations, caring nothing for honor and honest dealing with those who intrust their teeth to their care, give their professional advice and practice always leaning toward the money side, without regard to the best interest of their patient, and their rightful claim that he shall do the best that can be done under the circumstances, or abandon the case to some one who will more conscientiously do his duty. Men thus lowering themselves and bringing the profession into dishonor, by creating in the community a feeling of distrust of all dentists, the law cannot reach. Though in the ranks of the profession, they stand aloof from it. Having no sympathy with the more worthy and high minded men who strive to elevate the profession to the most honorable standing, they are guilty of lowering it to a bartering trade; selling themselves at any price that is offered, and making their boast of *cheap dentistry*; leading the people to believe that the difference between their own and the best operations of a reputable dentist is but a difference in price. By their success many a worthy operator has been disheartened, and

tempted to do the same thing; and worse also, that he may teach a mean man the extreme meanness of his ways. A man of principle and honor taking into his hands the weapons of a dishonorable practice is is in danger of being slain by his own hands.

This subject fairly introduces the question of *fee-bill*. There is no greater shame to our profession to-day than the fact so apparent in many localities of a divided interest in this matter. Neighboring dentists will not agree upon a price list. This embitters their feelings towards each other. I firmly believe that nothing so blocks the wheels of true progress in our new Western States as this low competition, this dogged determination of some mean man of the profession to undermine the practice of a neighboring dentist with the base pretense of offering the same skill and service at half price.

The only antagonism which an honorable man can offer to all this mischief and meanness, is a high toned character, and a reputation of being a different sort of a man, and a skillful operator.—proving his interest in his patrons by untiring pains taken to meet their wishes, and a determination to surpass their expectation. This is the course which self-interest, and not selfishness, prompts, and will secure a reputation among honest-minded people which will be an enviable and lasting professional capital.

I desire now to turn your attention to more pleasing themes

We have often discussed topics concerning the first molar—the importance and the extreme difficulty of saving it when at the age of from six to ten years it is found much decayed and causing pain. This is a subject which still demands our closest observation and most careful study. I fear that too many teeth of this class are sacrificed that ought to have been saved. We are too apt to forget, in our diagnosis of the condition of the teeth of children and young persons, that nature's work is still incomplete, that dentine, and enamel too, improve with age, that teeth which in early life tend to rapid decay, may, later in life, resist destructive agents, and give promise of permanence even in old age. I am satisfied that in nearly every case where the pain has been remittent, and for no longer period than a few weeks, treatment will restore the nerve to a healthy condition, and the tooth can be filled without subsequent pain. Indeed, I question the practice of extirpating the nerve of any tooth at this early age, and also the wisdom of any attempt to save a tooth that must so early be deprived of its pulp. It is useless to pretend that a nerveless tooth is in so sound and permanent condition as to bear a fair comparison with other

teeth. The Maker of man placed this delicate, highly sensitive and vascular organ within the walls of dentine for a vitally important purpose not to be tampered with.

This leads me to express the opinion confirmed in my mind by my practice for the last year and a half, that the use of arsenic should be abandoned; that all our treatment of exposed pulps, all our attempts to restore sensitive and aching teeth to comfort and permanent usefulness, should be persevering efforts to preserve the nerve alive. I have for many years felt that the practice of extirpation in such cases was wrong, and have always used arsenic with a strong mental protest.

I must say that there are great difficulties in the way of abandoning its use. It is time-honored; it pleads its thousand cases of rapid relief of pain, and the pleasing response of its many patients. My patients have begged me to use arsenic and kill the pain at once—have been unwilling to spend the time and suffer the annoyance of long treatment, whatever was the promise of success. But I have no hesitation in saying that the very intimate relation between the dental pulp and the peridentium renders it extremely hazardous to attempt to secure a slough of the former with the expectation that the latter will be left in its normal condition. Arsenic is uncontrollably irritating to the vital tissues at a point far beyond the line of devitalization and sloughing.

Admitting that extirpation of the nerve is *sometimes* necessary, I cannot but deem it a bad practice to devitalize with arsenic.

In my estimation the greatest question before the American dentists to-day is how to preserve teeth rendered painful by exposure of the nerve, without resorting to the extirpation of the pulp. Every month records new victories in the conservative treatment of this vital tissue of the dental organs, and I believe that the time is near at hand when this shall be declared the established practice.

My experience since totally abandoning devitalization and extirpation as a prime idea has been most gratifying to myself and generally to my patients.

Another question, scarcely second in importance to the one we have just been considering, is that pertaining to *saliva*. This fluid bathes the teeth from the time they are developed till death, or till they are lost from the mouth. I am quite ready to believe that if we could control the flow and character of this fluid, the strongest tendencies of the teeth to decay might be counteracted by it. Have we not in the

saliva, healthfully formed, the natural antidote for the diseases of the teeth? Its alkaline capabilities alone should commend it to our special attention for neutralizing the acid formations in the mouth. Healthy saliva is not only innocuous to the tooth substance but corrective of degenerating tendencies. How can the formation of vitiated saliva be prevented? By what constitutional medicament can it be restored, when vitiated, to its normal condition and flow? These and other questions pertaining to this subject promise to be fruitful sources of valuable information when thoroughly investigated.

I wish in conclusion to call your attention to one other point of very practical importance. Observation and experience have taught me, as many of you have, I doubt not, also been taught, to guard against the danger of irritating and inflaming the pulp by large metal plugs.

In cases of extensive decay, the intervening dentine between the filling and the nerve is so thin that extreme pain is often experienced in consequence of thermal changes. The irritation of the nerve thereby produced may terminate, and often does, in the worst results. I am fully convinced that the only safe practice is to begin the filling in *all* large cavities, where the depth of the walls makes it practicable, with some non-conducting, imperishable material, then complete the filling with gold or other metal, as may be desired. There are other important advantages in this practice besides safety from the danger alluded to, but time will not allow me to enlarge further.

I cannot, however, end my address without congratulating my brethren on the increasing number of good operators in our State, and on the important mission and service of Dental Colleges, Dental Journals and Dental Societies, in securing yet greater numbers. With the banner of their aid and protection over us, our profession must advance to that high position where science, skill and honor lead their votaries.

The chair appointed Drs. Wilson and Nicholson to conduct the new President, Dr. Hardman, to the chair.

On assuming the presidential honors, Dr. Hardman made a few appropriate remarks.

Dr. Tulloss moved that a vote of thanks be tendered the retiring President for his able and instructive address, and that the address be referred to the Publication Committee. Carried.

On motion of Dr. Wilson, Dr. Smith was excused from delivering an essay.

Dr. Ingersoll moved that the Society proceed to the selection of a point to hold the next annual meeting. Carried.

The respective advantages of several places were discussed, when the vote was taken, and resulted in the choice of Iowa City.

Adjourned to meet at 1½ o'clock.

AFTERNOON SESSION.

Society called to order by the President at 1½ o'clock.

The treatment of deciduous teeth was brought up for discussion. Dr. Wilson did not believe that amalgam should be used. Tin foil has the objection of requiring tedious work. Hill's stopping is not durable enough. Ulcerated deciduous teeth should be treated with great care. Cure disease if possible, but if not, extract the teeth.

Dr. Taylor thought deciduous teeth should be preserved as long as possible. Cases are governed entirely by individual circumstances. He finds that mercurius vivus is an invaluable remedy in treating periostitis.

Dr. Chase, of St. Louis, said he was in the habit of plugging with Hill's stopping or Osteo plastic. Would not like to put in many fillings of amalgam in a child's mouth. In using tin foil it is difficult to keep the cavities dry long enough. While there is chronic inflammation it is not perfectly safe to leave ulcerating teeth in the mouth, as more injury might be caused to the enamel of coming teeth than by extracting.

Dr. Ingersoll thought it very difficult to *know* anything about the matter. He mentioned the case of a child, three years old, whose mouth was filled with saliva on commencing to examine the teeth. Other children have firm teeth, and but little trouble is had. His treatment is to save teeth if possible. If he finds abscesses with only small fistulous openings he regards the case curable. He concluded by giving a very accurate statement of his method of treatment.

Dr. W. O. Kulp said that when he found deciduous teeth de-

cayed he first proceeded to fill with amalgam. Never saw any bad results by using the article. He thought it the easiest used and best filling. He did not believe a dentist was justified in extracting deciduous teeth under any circumstances. When the nerve is slightly exposed or very sensitive, first puts in the cavity of the tooth a layer of bibulous paper previously saturated with creosote. Prefers to fill the roots with cotton and creosote. Would treat ulcerated teeth in children the same as in adults, with creosote and iodine. Believed it a good method to cut off protruding roots. After doing this and treating ulceration, inflammation generally subsides.

At this stage of the discussion the following resolution was offered and adopted:

Resolved, That the members of the medical profession of this city be invited to attend the session of this Society and participate in the discussion.

Dr. Tulloss was opposed to the extraction of deciduous teeth. Prefers amalgam for filling. Should use Hill's stopping for bottom of cavities. He thought there was more to be feared in extracting teeth prematurely than in leaving them too long.

Dr. Wilson gave an instance of extracting the roots of two deciduous teeth, broken off at the gums, and thought it better to extract under such circumstances than to allow ulceration to go on.

Dr. Ingersoll mentioned a few peculiar cases he met with in this class of affections.

Dr. Chase remarked that in the extraction of teeth coming under this head, dentists should be very careful about running the forceps too far down, as they are liable to strike and injure the advancing permanent teeth. He thought the roots of the teeth protruding through the gum are necrosed, and that nature is attempting to expel the dead portions of teeth.

Dr. Smith said no case of necrosed teeth had been seen except where the pulp died first. He gave as his theory for the forcing of the root through the gum, that it was produced by want of vitality externally and normal vitality internally, in the adjoining parts to the root.

At this juncture the rules were suspended to give Dr. Taylor an opportunity to exhibit some fine specimens which he designed donating to the Missouri Dental College.

The next thing in order was the reading of the following essay by Dr. I. P. Wilson, of Burlington.

DENTISTRY,—ITS PROGRESS.

Dentistry, as a specialty of medicine, has finally struggled into existence under adverse circumstances. Away back in the dark ages of the past, surgery was looked upon as a dishonored calling. How different now. The skillful surgeon of to-day is regarded with distinguished honor.

But let us for a moment review the past. During the thirteenth century barber surgeons first came into practice, and it was not until the fifteenth century that the general practitioner attempted to perform even minor operations in surgery. At first they were looked down upon, and even excluded from respectable society. A few of them associated themselves together, and sought to elevate surgery as a separate branch of the medical profession.

About the year 1580, students were admitted to a medical university in France, and then and there for the first time, the study of surgery was pursued as a branch of the medical profession. General and Dental surgery may be dated from this period, and its progress from that day to this has been steadily onward and upward.

When students were admitted to this university, the respectability of the specialty was at once acknowledged, both by the medical practitioner and the people generally. France seems to have taken the lead in this great movement, but England entered the field as a competitor, and the contest went on, resulting in the advancement of surgery, and the promotion of the cause.

The first dentists who practised in America were from France and England. They came to this country about the year 1780. The first American dentist commenced practicing in the City of New York soon after this; others entered the profession, and dentists in America became numerous.

The *American Journal of Dental Science* was first published in the year 1839, and during the same year was established the Baltimore Dental College, the first institution of the kind in the known world.

This college came into existence when your humble speaker was but two years old. So we see that even in our own day, and on American soil, this great progressive movement was made.

Other institutions of the kind were afterwards established in the East, and conducted by the ablest men of the profession, resulting in great good.

And now we speak with pride when we say that another great onward movement has been made within the last few years. We refer to the medical basis upon which the Missouri Dental College has been established. The facilities offered by such an institution are of a superior character, and I believe the day is not far distant when all our colleges will see the necessity of adopting a thorough medical basis as the only substantial foundation upon which our profession must stand.

When I consider what has been done in the past, when I realize what is being done in the present, and contemplate what *may* be done in the future, I feel a swelling heart, an aspiration of soul, and a deep sense of gratitude that 'tis my privilege to live in this nineteenth century, and to aid in carrying on this great progressive work.

But we must labor, we *must* labor or we must fall behind in the mighty work there is to be accomplished.

The great wheel is in motion, and if our shoulders are not found pressing it onward, others will take our places and accomplish the work, and we will be left far behind to grope in darkness, and to be numbered with old fogies.

Yes, the present and future are fraught with deep interest to each one of us. A great work is before us; shall we not go forth as earnest seekers for truth, aided by the warm rays of science, and with the microscope as our faithful friend, and with "Excelsior" as our motto, and with hearts inspired with true love for our noble profession, let us not slacken our efforts, but with honest pride in our calling, let us emulate the example of the immortal Tomes, holding fast to all the facts that he has established by his diligent researches, and careful investigations, and with eagerness for "more light," let us venture into new and unexplored fields with a determination to establish new truths, and to shed light where darkness now abounds.

This is our privilege, and with firm purpose of heart, we cannot fail to accomplish the great work that is given us to do.

Let us not content ourselves with the present attainments—a suffi-

ciency for to-day will not suffice for to-morrow. It is not enough that we should simply follow the work of others, but let us launch forth in the strength that God has given us, and in our *onward*, *upward*, and homeward march, let us gather rich sheaves about us, that we may leave our posterity a rich legacy, even the golden fruits of our labors.

Dr. W. O. Kulp then commenced reading his "Notes on Daily Practice in Dental Surgery." After reading the following portion, discussion was engaged in.

GENTLEMEN:—My object in presenting these notes on the daily practice of dental surgery upon this occasion, is to bring out the members of the society on the various subjects presented, or in other words present subjects important to all for discussion. After each head, I hope there will be free discussion upon the subject presented before passing to the next.

1st. Difficulty of devitalizing denuded pulps for pregnant or nursing females.

I have observed that in most cases, after the milk begins to secrete in the mammary glands of pregnant females, there is great difficulty in successfully performing this operation, and that this difficulty increases until after the sixth month of gestation. I make a note of a few cases that have come under my treatment within a few months.

Mrs. ——, pregnant about six months, called in company with her family physician, to get relief from severe toothache, which, I found, was caused from the exposure of a nerve in right lower first molar; nerve in a high state of inflammation. After thoroughly cleansing cavity, I applied our usual medicine to destroy nerves. The patient left my office free from pain. Returned again in 24 hours, as I directed. Reported no further pain since the day before. Upon removing the cotton plug there was violent pain, and found the nerve even more sensitive than the day before. I applied fresh dose, removed again in thirty hours: found nerve as sensitive as ever. I applied the arsenic and creosote the third time before I could extirpate nerve, and then there was considerable pain attending the operation.

2d case. Mrs. ——, aged about thirty years, nervous sanguine temperament; was nursing her first child, which was four months old. This lady was suffering from exposed nerve in right superior bicuspid. I was obliged to apply the preparation the third time before I could remove nerve.

3d. Mrs. L——, aged 35 years, was nursing her fifth child, which was only four weeks old. She was of bilious lymphatic temperament. Nerve exposed in right lower second molar; very severe pain; reported more or less pain all during her pregnancy; called it neuralgic, and was treated by her physician for same even up to her visit to my office. In this case I applied the arsenious paste four times ere I could remove pulp. There was considerable pain after each application of the paste.

I could cite many more cases similar to those reported, but these are sufficient for illustration. I have not had time to analyze the blood of such patients, but will do so as soon as opportunity offers. Perhaps some of you have investigated this subject and are able to give some solution of the cause of this strange freak of nature. One thing I have observed, viz: that such cases have been what we might call "good milkers." There must be something in the blood of such persons that neutralizes the arsenious acid. What is it?

Dr. Tulloss:—Thought difficult cases of the nature indicated were caused by the high state of the inflammation of the pulp.

Dr. Smith:—Stated that when he finds the pulp in a high state of inflammation he should not use arsenic, as it might increase the inflammation. Apply creosote or something else to reduce the pulp to its normal state. In the case of pregnant females there is more nervo-vital fluid: circulation is more active; hence treatment is more liable to fail. In the first place, the arsenic cannot be absorbed, but is taken up by other vessels besides nerves. Would treat such teeth constitutionally with nervous sedatives and local palliative applications.

Dr. Chase:—Waits, after an application once, and if the pulp is not dead, waits a week longer, and sometimes two or three weeks, until the pulp is dead. He considers it dangerous to keep

renewing arsenic, as it is liable to destroy the periosteum of the root, as it has been demonstrated that there is communication between the tubuli of the root and the tubuli of the crown.

Dr. W. O. Kulp:—Said his habit is to put in temporary filling in case of pregnant females, and after confinement put in the gold.

Dr. Ingersoll:—Thought the cause of such difficult cases was the unusual excitement of the female, general debility, and the feebleness of females. Was once called on by a woman seven months in pregnancy, who had the toothache, and gave her the following preparation to alleviate pain: Equal parts of chloroform and tincture of aconite: also a foot-bath. They resulted successfully.

Dr. Chase:—Thought a foot-bath very dangerous in cases where a woman is liable to miscarry, as it might produce abortion.

Dr. Ingersoll:—Explained by saying that an insufficient and careless bath was quite different from the kind he suggested, and might have an entirely different effect.

Dr. Kulp then resumed the reading of his notes, as follows:

Epulis is properly a tumor of the gums, assuming various sizes, from that of a pear to the size of an egg. There have been cases where they became much larger. They are in substance generally cartilaginous. Sometimes I have found them soft and of fatty consistence. Their attachment to the gum and alveolus is sometimes very small, while at other times it extends over a larger surface than the size of the tumor. I have removed them by tying a ligature around the body, and, by a sudden jerk, taking them out by the roots. This is not always a safe method, however, for sometimes the roots are left in, and the cure is only for a season.

The process of removal with which I have been the most successful is as follows, viz: With a gum lancet or other knife cut a ring around the tumor, far enough away from the tumor to be sure that there will be no roots left, being careful that the knife goes down to the bone; dissect off the piece of integument thus

separated, including the tumor: after removal scrape the bone to the depth of one-eighth or even one-quarter of an inch; wash off the surface of the thus scraped bone with cold water by throwing it in with a syringe, so as to remove all loose bone. By this thorough process we are sure of a cure. The hæmorrhage can easily be controlled by the use of a weak solution of persulphate of iron, if not by water alone. I found napkins placed in the mouth and around the tumor, when it was possible, very useful in preventing my patient from strangulating, or even the mouth from filling up with blood. The use of the spray apparatus in such operations is very convenient and beneficial, as it closes the smaller vessels by contraction, thus preventing bleeding very much—leaving the field all clear for the operator, as well as obliterating pain almost if not entirely.

Ranula is a disease which the dentist often comes in contact with. It generally appears in the sub-lingual gland, and is produced by the obstruction of some one or more of the ducts leading from the gland into the mouth. If the obstruction is removed in season there is no further trouble arising, more than some inflammation, which will soon subside after the calculi is removed.

Very serious tumors are sometimes caused by allowing this obstruction to remain in the duct for a long time, sometimes becoming as large as the fist of an ordinary sized man. I have never seen any so large, but have known through others that this is a fact. Those I have seen contained a sort of a semi-fluid resembling the white of an egg, and contained carbonate and phosphate of lime, in the form of dust and grit and very small pebbles. The cure is effected by thoroughly opening the abscess or tumor with the knife, and washing out its contents with warm water injected into every corner, thus thoroughly cleansing it of all fragments described. After this is accomplished, inject into it a solution of equal parts of creosote and iodine. The practice of surgeons is to put in a rowel, which I do not consider necessary, for the inflammation gotten up by the creosote and iodine is generally sufficient to effect a cure. It is sometimes necessary to apply it more than once. Tumors of the glands are generally

produced by obstruction of some kind, either in the ducts or lobules, or sometimes by accident.

Here the Doctor ceased reading, to give the society an opportunity to discuss the subject of tumors.

Dr. Smith:—Had three cases of tumors in the mouth; one of the tumors gave way under the excitement of the treatment, others he cut out: used iodide of potassium as a constitutional remedy, and various articles externally.

Dr. Taylor:—Had one patient, rather sanguine temperament, twenty-seven years of age: he had a large tumor in front, and had displaced the central and lateral incisor on the right side; the tumor was as large as a hen's egg: put the patient on crackers and tea: then, by ligating the tumor, brought down the neck to the size of a pipe stem: then excised it: dissected upper gums, and with excising forceps cut out diseased maxillary: cauterized with nitrate of silver, and ligated with interrupted sutures: had another case of cancerous tumor, where a man had an ulcerated tooth, and neglected to have it out: one-half of the superior maxillary had become necrosed: after constitutional treatment, performed an operation by a vertical incision back of lateral incisor: removed the superior maxillary to the posterior surface of the wisdom tooth, and mesial line of mouth: then took out pieces of diseased bone with incising forceps, trimmed with chisels, scrapers, etc.: brought the wound together, and united with interrupted sutures: the parts then recovered in an incredibly short time: replaced the parts by artificial substitutes.

Dr. Chase:—commended the operation as a commendable achievement, and significant of the progress of dentistry.

Dr. Ingersoll:—Extracted tooth of a lady, and found he had opened an exostose tumor: this tumor seemed located in the superior maxillary and mucous membrane: left her case to take care of itself, and it did get well. A colored man called on him with a tumor under the upper lip: tooth had been extracted several years ago, but had broken off, and a portion of the tooth was then remaining: began treatment with caustics, but found

it wrong; then extracted the root, bandaged the tumor, and had no farther trouble.

Dr. Mason mentioned a case where he pulled out a root, and a tumor burst out.

Adjourned until Wednesday, at nine o'clock.

SECOND DAY—FORENOON SESSION.

The session was called to order by the President.

Dr. Taylor, of Ft. Madison, introduced an invention of his own, styled a parotid duct compressor, for keeping the mouth dry during operations. It was highly recommended by Dr. Chase, of St. Louis. Dr. Wilson, of Burlington, also extolled the invention, and, having examined it, recommended it as the best thing for the dental profession ever introduced.

Dr. Ingersoll then offered the following, which was adopted:

Resolved, That a vote of thanks be tendered to Dr. H. D. Taylor, of Ft. Madison, for presenting to the notice of this Society an important invention of his own for closing the duct of Steno while operating in the mouth, and for his commendable generosity in giving so important an invention freely and without patent to the profession.

Resolved, That our thanks are also due to Prof. Chase, for his modification of same.

Dr. Chase exhibited an improved form of rubber dam pliers, and explained their use, in ackowledgment for which the following was offered and adopted:

Resolved, That a vote of thanks be tendered to Dr. Chase for exhibiting and offering freely to the profession his improved form of rubber dam pliers.

Dr. W. T. Rigley, of Tipton, and Dr. E. H. Sternamen, of Cedar Rapids, applicants for membership, were then accepted as junior members, on recommendation of the Committee.

Dr. Kulp then proceeded to read his notes on daily practice, as follows:

The treatment of irregularities of the teeth is a subject every

dentist is greatly interested in. There are many points that need ventilation, and by rubbing together our ideas we may get some light where we need it.

I will present a few cases, some of which I will present the models for your consideration and study. I ask your counsel, so express your opinions freely.

Case 1st, is a patient 10 years old, which you see is an entire crowding out of the dental arch of the cuspidates of the upper jaw. The question in my mind is, is it good dentistry to extract any of those teeth in order to make room for these cuspidates? I think we ought not to extract one tooth needlessly, so I have decided upon this plan, viz.: To make a rubber plate to cover the roof of my patient's mouth, and fit it very tightly between the teeth so as to press the teeth outward and backwards as the plate is pressed up. After the teeth have yielded and the plate is to its place, I purpose to drill holes into the marginal edge of the plate, and insert hickory pins, cutting them off to proper length; when plate is returned into mouth the same pressure as before is continued. As soon as the teeth yield sufficiently, renew the pins with larger ones, thus continuing until room is made to bring into the arch the stray cuspidates, and then bring them in by ligatures and by pressure in a similar manner as before described.

Dr. Kulp here presented a model to illustrate his ideas.

Drs. Tulloss, Ingersoll, and Myers, gave their views on the questions before the Society, and made some very instructive remarks.

Dr. Kulp then continued his essay by reading the following:

Our duty to our patients—the matter of courtesy to those who employ our services, needs more consideration than we are apt to give. I was much pleased with what I heard said on this subject at the Missouri State Society last year. I present it here so that we may take our part in directing the attention of the profession to this matter.

The question of observing due courtesy to patients was then

discussed to some considerable length, and with profit to the society.

Dr. Kulp, as a conclusion to his essay, then read the following for discussion:

Are we permitted to extract teeth for pregnant females? If not, why not?

Dr. Ingersoll:—Thought there was no particular danger in such cases.

Dr. Tulloss:—Thought the danger consisted mostly in extracting the teeth of such subjects when they are frightened.

Dr. W. O. Kulp:—Mentioned a case of a woman three months in pregnancy, where abortion was occasioned by extracting a tooth.

Dr Tulloss:—Stated a case where he extracted the tooth of a woman nearly nine months in pregnancy without causing any unusual results.

Dr. Dean, of the medical profession:—Stated that undue excitement would produce premature child birth.

Dr. Graham, of the same profession:—Thought it not safe to extract teeth when the female is near the time of confinement.

Dr. Smith:—Thought dentists should be very careful in extracting teeth from pregnant females: and before operating they should ascertain the condition of the patient. The action of the dentist should be governed to a considerable extent by local and individual circumstances.

Dr. Wilson:—Asked whether it would be any more dangerous to administer anæsthetic agencies while extracting teeth.

Dr. Dean:—Recommended chloroform, if any anæsthetic be used.

Dr. Ingersoll:—Mentioned case of a woman—an invalid, seven months in pregnancy—who had an aching, loose tooth. He administered an external remedy and a foot-bath, and the patient was all right next day. Mentioned another case of a pregnant female who endured the extraction of a tooth with perfect composure, but after the operation she fell back, and was laid up in

bed some three weeks from the shock. Thought there are very few teeth that demand extraction during pregnancy.

Dr. Chase:—Said he had never hesitated to extract teeth of pregnant women when necessary, though he had not often found it essential. Never has known any untoward results. Never has even hesitated to give anæsthetics during such operations, but generally administered two or three hours after eating.

Dr. Graham:—Thought the use of anæsthetics that would alleviate pain and lessen the shock would be admissible. Thought the gas used by dentists preferable to chloroform.

Dr. W. O. Kulp:—Thought he could tell whether a female was pregnant, after two months, simply by the appearance of the mouth, the mucous membrane having a peculiarly sallow, bluish cast, and the mucus giving a peculiar sensation to the touch.

Dr. Smith:—Thought dentists had as much right to inquire into the condition of females as medical men.

Dr. Graham:—Never knew a married lady to be offended by being asked her condition by either physician or dentist.

On motion of Dr. Ingersoll, the regular time of holding the meeting was fixed for the second Tuesday in July.

The regular programme was then taken up, and the subject of the treatment of exposed dental pulp was brought up for discussion.

Dr. Chase:—Believed it an easy matter to save exposed pulps when the dentist exposes them himself, but where the pulp has been the subject of much pain, and has sloughed away, it becomes a different matter. Where the root vessels are alive he don't persist in destroying them, but plugs the pulp cavity and fills.

Dr. Rathburn:—Related a case where he capped the nerve, and filled with Hill's stopping.

Dr. Chase:—Has had much success in saving exposed pulps alive, by using osteo-plastic.

Dr. Nicholson:—Has used osteo plastic in capping, with success.

Dr. Graham:—Thought all the natural vitality there was in the tooth should be saved.

Dr. J. S. Kulp's:—Mode of treating was to destroy exposed

nerves, except when exposed by excavation, and then cap with os artificiel.

Dr. W. O. Kulp:—Stated that for several years he had saved the exposed pulps of young subjects. Has tried several articles for covering exposed nerves, and has gone back to bibulous paper. Finds more success in saving teeth by destroying and extirpating the nerve than by any other treatment. Thought a tooth should never be extracted on account of a nerve being exposed.

Dr. Wilson's:—Plan in case of entire exposure is to devitalize and then extirpate: but in cases of partial exposure caps with non-conducting substances.

Dr. Tulloss:—Saturates the cavity with carbolic acid or creosote when the nerve is exposed by excavation, and fills with Hill's stopping. Advised the extraction of the teeth of exposed nerves if the patient will not promise to be promptly on hand for treatment.

Dr. Smith:—Would generally devitalize nerve. Objected to extracting a tooth under any circumstances where it can be avoided.

Dr. Goble's:—Plan is to devitalize and then extirpate. Avoids extracting.

Dr. Mason:—Washes with creosote, and then fills with oxychloride of zinc, generally. Don't believe in extracting.

AFTERNOON SESSION.

The discussion concerning the treatment of exposed pulps was resumed.

Dr. Ingersoll:—Began to save the nerve when partly exposed some thirteen years ago, and experimented with various kinds of filling; tried plaster of Paris ten or twelve years ago. Being unsuccessful in attempting to save the nerve, then went back to extirpation. But about five years ago began to feel that the use of arsenic was dangerous to the peridentium, and has not used it at all for a year past. Failure is frequently due to patients not reporting themselves regularly for treatment. His method of treatment depends upon circumstances. First finds whether

the nerve is in a suppurative condition, if so, destroys it: all the while keep the cavity closed to exclude the atmosphere. Proceed with stimulants until the pain is arrested. If there is no pain for a week proceed to fill in with bibulous paper and creosote or carbolic acid. Another important article in treatment is the addition of tannin with carbolic acid.

The committee appointed to draw up a bill to regulate the practice of dentistry and suppress quackery in the State, reported a bill, the sentiments of which were approved. The bill, however, was referred back to the committee with instructions to consult with Attorney General O'Connor and have it revised and drawn up in proper form.

Dr. Mason offered the following resolution, which was adopted:

Resolved, That the thanks of the Iowa State Dental Society be tendered to Drs. Hardman and Kulp for the hospitable manner in which they have entertained its members, to the proprietors of the Ogilvie House for reducing the rates of board for the members of the Society, to the proprietors of the *Journal* and *Courier* for publishing the proceedings of our sessions, to Dr. Kulp for the use of his office for holding our meetings, and to the Northern Line Packets for reduced fare.

The Chair appointed Drs. Smith, Mason and Sayles as a committee to arrange a programme of exercises for the next session of the Society.

The following resolution was offered and adopted:

Resolved, That the Committee on the Revision of the Constitution and By-Laws be authorized to get up a parchment certificate to be issued to members of this Society who shall regularly pass the examination of its Board of Examiners, and those holding such certificates shall be exempt from the examination provided for in the law regulating the practice of dentistry in this State.

Dr. Mason moved that any member of this Society being in attendance upon the session of any other Society be regarded as a delegate from this body. Carried.

Dr. W. O. Kulp offered the following resolution, which was adopted:

Resolved, That the Secretaries be instructed to publish the proceedings of this Society and its essays in the *Missouri Dental Journal*, as a supplement to that journal.

The subject of filling teeth was next brought up.

Dr. Smith:—Thought it one of the most important subjects. First he should cut out all the diseased portions of the teeth and have perfectly clean walls. He gave a description of his manner of cleaning out cavities. Thought such a cavity could not but retain a gold filling. He gave his *modus operandi* in applying the filling. Does not think it best to touch the gold in preparing. Should prefer to use Eakin's gold.

Dr. W. O. Kulp:—Prepared pellets by taking a piece off with the pliers and rolling with fingers, in pellets, hard or soft, and of various sizes. Prefers to use Eakin's or Johnson & Lund's gold, No. 5. Don't think it less pure or adhesive by handling with fingers than if handled with a ten foot pole.

Dr. Smith:—Explained that the reason of his being so particular about touching gold, is that the exhalations of the body causes a certain substance to pass from the fingers to the gold, exercising a damaging influence upon it.

Dr. Dean:—Stated that there was a great difference in persons, some exhaling much more than others.

Dr. Chase:—Gave his method for preparing gold for filling. Uses adhesive gold; objects to having the gold heated red hot, as it is likely to injure it. When there is an opportunity to use the cylinder form of filling, it is to be preferred, as it saves one-half the time in inserting. He advised the use of the rubber dam on account of its many advantages. He mentioned another invention, manufactured in St. Louis, for holding the rubber dam over either the molars or bicuspids. In almost imperceptible cavities in bicuspids, instead of making V shaped cavities by cutting through the enamel and dentine by way of grinding surface of tooth, he would open the cavity by cutting the enamel near the neck of the tooth.

The subject of mechanical dentistry being the next in order, Dr. Ingersoll said he had hard work to get good sets of teeth on account of a seeming economy of manufacturers. Should a bicuspid fall out, it would be difficult to tell whether it belonged to the upper or lower set. He wished that manufacturers were dentists, so that they would know how to make their own sets.

Dr. Chase:—Suggested that it would be a good idea for dissatisfied dentists to send to Samuel S. White and suggest improvements, which no doubt would be made.

Dr. Smith:—remarked that there were philosophical principles for the formation of a set of teeth. The greatest objection to teeth is a lack of the principle of uniform pressure. He illustrated his ideas by diagrams, and explained the principles he thought necessary in a perfect set of teeth.

Dr. Chase:—Here recommended the use of black rubber in preference to the red, as the former does not produce the unpleasant results of the latter. To obviate the objection of color, put a layer of English pink rubber over the black where it is likely to show.

Dr. W. O. Kulp:—Agreed with Dr. Chase, and also recommended manufacturing rubber after the plan of Dr. Stuck.

A fine set of artificial teeth was presented by Dr. J. Hardman, showing the use of a new connecting compound, by which the common block teeth used for rubber mounting are firmly and nicely attached to any of the metal bases by a speedy mode of moulding, admitting of fine polish and easy repair. They are strong, pure in the mouth, and cheap. For under sets the teeth are used alone on the "cheoplastic" plan, and are superior to most of those so highly seasoned with patent plasters.

On motion, adjourned to meet at 8 o'clock P. M.

EVENING SESSION.

Society called to order at 8 o'clock.

The Secretary read a letter from Wm. H. Marvin, Marshalltown, Iowa, expressing his regret at not being able to be present and enclosing two teeth, specimens of malformation. One of the

teeth was claimed to be a union of a deciduous and permanent tooth.

On motion, Dr. Chase was authorized to draw on the Treasurer for a sufficient sum of money to pay for publishing the minutes of the proceedings in a supplement to the *Missouri Dental Journal.*

The subject of Dental Therapeutics was taken up, when the merits of creosote, carbolic acid, and other preparations were discussed by different members.

On motion, adjourned *sine die.*

SOUTHERN DENTAL ASSOCIATION.

We received a "Newspaper" report of the proceedings of this new Association, the first meeting of which took place at Atlanta, Georgia, on the 28th of July last. As the report was made up by the "newspaper reporter" it was without a "local habitation or a name," and we delayed our notice of it till we could at least *christen* it correctly. We are much gratified to learn that the number in attendance was so large, and have no doubt but that it will be an active member of the great circle of Dental Associations, which are doing so much to elevate the profession throughout the civilized world. We notice among those present at this meeting the names of many eminent men; and even the short and imperfect report furnished us of their proceedings, shows that they are fully alive to the requirements of this progressive age. As we have not been furnished with a copy of the constitution and by-laws, we can, of course, express no opinion thereupon.

The names of the officers for the ensuing year are as follows:

President—Dr. W. T. Arrington, of Memphis.

1*st Vice-President*—Dr. Reynolds, of South Carolina.

2*d Vice-President*—Dr. Angspath, of Arkansas.

3*d Vice-President*—Dr. McAuley, of Alabama.

Corresponding Secretary—Prof. Gorgas, of Maryland.

Recording Secretary—Prof. Angell, of Louisiana.

Treasurer—Dr. Redman, of Kentucky.

Executive Committee—Drs. Morgan, of Tennessee, Knapp, Walker and Chandler, of Louisiana, and Hape, of Georgia.

The following committees were likewise appointed:

On Membership—Drs. J. S. Knapp, La.; T. J. Jones, Ga.; G. J. Friedericks, La.

On Publication—Drs. W. S. Chandler, La.; J. R. Walker, La.; J. G. Angell, La.

Dental Education—Drs. F. J. S. Gorgas, Md.; J.P.H. Brown, Ga.; W. M. Reynolds, S. C.

Physiology and Surgery—Drs. F. Y. Clark, Ga.; S. Rambeau, Ala.; J. Fouché, Tenn.

Dental Chemistry—Drs. J. G. McAuley, Ala.; W. H. Burr, Ga.; F. M. Allen, Ga.

Dental Therapeutics—Drs. F. Y. Clark, Ga.; G.J. Friedericks, La; H. Marshall, Ga.

Operative Dentistry—Drs. W. H. Morgan, Tenn.; J. Fouché, Tenn.; H. A. Lowrance, Ga.

Mechanical Dentistry—Drs. W. G. Redman, Ky.; E. W. L'Engle, Ga.; S. G. Holland, Ga.

Dental Literature—Drs. J. P. H. Brown, Ga.; H.A. McDaniel, Ala.; T. J. Jones, Ga.

Voluntary Essays—Drs. J. R. Walker, La.; J. M. Day, S.C.; W. S. Chandler, La.

Histology and Microscopy—Drs. W. T. Arrington, Tenn.; T. J. Jones, Ga.; John C. Angell, La.

The whole number of members present was over forty, as follows:

Georgia—H. Marshall, A. C. Ford, J. D. Thomas, Albert Hape, E. B. Marshall, C. D'Alvigny, Atlanta; H. A. Lowrance, Athens; R. A. McDonald, Griffin; J. P. H. Brown, S. G. Holland, Augusta; T. J. Jones, Sparta; H. T. Henry, Covington; J. A. Tigner, Fort Valley; E. W. L'Engle, F. Y. Clark, Savannah; T. W. Hentz, J. Fogle, Columbus; W. H. Burr, Madison; T. J. Crowe, Macon; E. M. Allen, Marietta; B. B. Alford, LaGrange; W. T. Cole, Newnan.

Alabama—S. Rambeau, Montgomery; H. A. McDaniel, C. A. Jordan, Huntsville; H. B. Boyd, Troy; J. G. McAuley, Selma.

Tennessee—W. H. Cook, Cleveland; John Fouché, Knoxville; W. T. Arrington, Memphis; W. H. Morgan, Nashville.

Kentucky—W. G. Redman, Louisville.

Arkansas—L. Angspath, Helena.

South Carolina—W. Reynolds, Columbia; J. M. Day, Aiken.

Louisiana—J. S. Knapp, J. R. Walker, J. G. Angell, G. J. Friedericks, W. S. Chandler, New Orleans.

Maryland—F. J. S. Gorgas, Baltimore.

The Southern States have, perhaps with the exception of Missouri, hitherto given less attention to the organization of Dental Societies and Associations than those of the North, and we are rejoiced to see that this condition of things will soon cease to exist, and that the advantages of associated action will soon be equalized. These laudable efforts commend themselves to our sympathy, and we shall be most happy to do what we can to encourage and sustain these grand movements which are vivified and kept alive by the true spirit of scientific advancement.

J.

Chicago, Sept. 20, 1869.

Editor Mo. Dental Journal:

As applications and letters of inquiry are being almost daily received in regard to the first session of the "Chicago Dental College," I am requested by the Committee of the Board of Trustees to announce that the delay necessary to the formation of such a faculty as was desired, rendered it too late for the proper announcement of a course for the present season.

The first course of lectures will be delivered next year, due announcement of which will be previously given.

Respectfully, Saml. B. Noble,

Secretary of Board of Trustees.

The Missouri Dental Journal.

A MONTHLY RECORD OF THE SCIENCE.

VOL. I.] NOVEMBER, 1869. [No. 11.

HISTOLOGY.

[We copy from the *St. Louis Medical and Surgical Journal* the following Review by G. Baumgarten, Editor, of a work edited by S. Stricker, Leipzig, entitled "Handbook of the Histology of Man and Animals," and which comprises the most recent doctrines upon certain mooted points that have been put forth by several of the most distinguished investigators of the old world.]

Histology, i. e. the anatomy *and physiology* of the tissues, for the two are as yet inseparable, is a modern science, and one which is so rapid in its progress, so energetically pursued by industrious students, so importunate in its demand for recognition, that no treatise can fully represent its condition at the given time, and the ablest exposition of its truths and tenets soon becomes superannuated from the discoveries of new facts, and the consequent elucidation, modification or subversion of the doctrines of a few years ago. Such at least has been its past history. The systematic works on histology which we possess at present do not by any means accurately portray the state of the science; its facts are scattered in the files of our periodical literature, and nothing but patient and diligent study of innumerable individual labors can avail in the effort to keep *au niveau* of to-day's knowledge of the subject. The attempt to collect the accumulating experience, to represent the full development at the time of writing of such a science as this, is, therefore, a difficult task, but one which will meet with general applause and be most gratefully received.

The attempt is now being made by a number of German mi-

croscopists, among whom are some of the best of our day, e. g. Brücke, Cohnheim, Kühne, Pflüger, v. Recklinghausen, Rollett, M. Schultze, et al., each of whom devotes himself to the elaboration of his own favorite branch, and whose joint labors are united into one systematic volume under the editorial care of Stricker. The advantages of this division of labor are self-evident: whether the authors will be successful in producing a homogeneous whole, is a question which the first part now before us allows us to hope will be answered in the affirmative. The book will be issued in four parts, of about 200 pp. each, and is to be completed by the end of this year. An analysis of this important work, amounting as it does to a review of the histological doctrines of the present day, may be of some interest.

Dr. Stricker introduces the work by a chapter of 28 pages on the general methods of study, the preparation of objects for examination, the employment of moisture, gases, heat, electricity, etc., injection, staining and the use of reagents.

The Cell.—The same author prepared the general chapter on the "cell." Previous to Schwann, the microscope distinguished fibres, cells, globules and granules,—formations which were considered not independent in their growth, but subject to the influence of the vessels; hence they were separated from vegetable tissues, which have an independent life. Schwann (1839) enunciated the important principle that "the animal cells throughout are analogous to those of plants; the animal cells are as independent in their growth as they; the vessels of the animal body only occasion difference in the distribution of the nutritive fluid;"—and John Müller accepted the position. Virchow compared the organism to a free state of individuals with equal rights, though not equal faculties. The views on the biological importance of the animal cell had thus been completely changed. The investigation of the lower forms of animal life advanced these ideas. Dujardin in 1835 discovered in lower animals a contractile substance which he called *sarcode*; it was at first considered peculiar to lower animals, irritable without the intervention of nerves. it was found that a lump of sarcode may be a living, independent individual. Farther discoveries (of the con-

tractility of embryonic cells and the similar changes of form in colorless blood cells, ciliary motion, the comparative studies of muscular substance and sarcode) made it probable that the contents of all cells are contractile, a supposition expressed by Kölliker. It remained for Max Schultze to demonstrate (1861) that sarcode is analogous to the substance of the animal cell, and thus to enlarge the doctrine of Schwann. The cell now was recognized as the typical morphological element of the entire organized creation.

As to the form of the cell, from the similarity of the cells of the chorda dorsalis to vegetable cells, Schwann supposed all animal cells to be constructed on the same plan: a wall limiting a cavity, which contained fluid contents and a nucleus. Where the membrane or wall could not be seen, it was assumed. This diagram was generally accepted together with his principle of the analogy of the animal and vegetable cell. Occasional opposition to it remained without effect, so long as that principle also was attacked. Max Schultze, however, succeeded in subverting this vesicular diagram of the cell: he, like Leydig and others before him, defines the cell as a lump of substance (protoplasma) enclosing a nucleus; the weight of his definition, however, does not consist in denying the existence of the cell wall in many or most cells, but in the recognition of the identity of the so-called cell contents with animal protoplasma or sarcode. The embryonic cells, he says, resulting from the division of the cells of the ovum, may be regarded as the true types of cells; and in these nothing can be found but a lump of protoplasma and a nucleus. Both nucleus and protoplasma are the products of division of the same constituents of another cell. The protoplasma is not limited externally, but by the circumstances that it does not mix with the surrounding medium, and by the peculiarity that with the nucleus it forms a whole. On the surface of the protoplasma a (chemically different) membrane may form from it, but this can be looked upon as a sign of beginning regressive change. A cell with a membrane cannot divide as a whole; only the protoplasma enclosed in the membrane can divide. Brücke goes still farther in his definition of the cell and says it is not proved that the nu-

cleus is indispensable, basing his opinion chiefly on the fact, that cells are known to occur in cryptogams and elsewhere, in which no nuclei can be perceived. Stricker seems to accept this view; he agrees to apply the historic name of cell to the morphological elements of higher animals or to independent living bodies, even if there can be discovered in them nothing but a lump of animal protoplasma. But in order to call an isolated mass of living material a "cell," we must be able to perceive in it that sum of phenomena which characterize an independent organism; these are, active or "spontaneous" motion, nutrition and growth, and propagation.

Motion in cells is a phenomenon directly observable. The mobility of the protoplasma is inferred from certain movements of the granules enclosed in it, or from certain changes in its form. The protoplasma or contractile substance, even with the best optical means, appears homogeneous, without structure; but it frequently contains embedded in it, aside from particles of pigment or small globules of fat, a number of small, colorless, usually bright, highly refracting granules. In living cells these granules are often observed in passive motion, either progressive or oscillating. The progressive movements are certainly dependent on vital processes of the cells; it is still matter of controversy, if the oscillating movements be connected with life.

The changes of form are most decided in the lower forms of animals, especially the amæba and like animalcules, whence the designation of amœboid cells for cells moving independently. The cells of animals of a higher organization rarely move as rapidly as the amæba. Their movements are confined either to gradual changes of form, or to the projection of processes which are either followed by the rest of the cell body, or else are drawn in again. From repeated movements of this kind we can safely conclude that the object we are observing is living; on the other hand we are not able, from the absence of motion alone, to conclude that it is dead. Protoplasma corpuscles are not only capable of changing form, but also place; they can "wander." This is accomplished by a part of their mass moving forward, whereupon the rest pushes on after it. The repetition of this

manœuvre results in locomotion, which can take place, however, only upon firm substrata, not in fluids. The migratory faculty of cells in composite animal organisms has been discovered by v. Recklinghausen.—an observation of the greatest value to our science. With the aid of the method of "feeding" cells with particles of insoluble pigment, he was enabled to demonstrate the important fact that pus corpuscles are not always generated in the spot where they happen to be found. This result has since borne fruit. Stricker (1863) showed that in the building up of the embryonic organism, the change of place of cell masses for the construction of organs depends on migrations of the primordial cells within the ovum. Cohnheim (1867), by showing that white blood corpuscles can leave the vessels—emigrate, gave expression to a principle of the utmost consequence to physiology.

The movements* of the contractile substances are influenced by certain external conditions. The influences of this kind which are known are: changes of temperature, mechanical agencies, electricity, nerve influence, chemical agents. We have not space to enter into the interesting details of the subject.

The *nutrition* of cells, the mode in which the exchange of matter is carried on, is still in obscurity, There has been made but a single direct experiment on living cells, which we will mention, as it is our purpose to show the recent advantages in histological science and the amount of ingenuity and laborious research devoted to it. Kühne showed that ciliary motion is connected with a consumption of oxygen, and that the cells can derive the necessary oxygen even from loose chemical combinations. In an atmosphere of hydrogen and a solution of oxygenized hæmoglobin, ciliary motion will continue until the loosely

*The author explains that in asserting that the protoplasma is capable of active or vital movements he does not countenance the assumption of an immaterial force. There is but one kind of forces upon which the motion of any body depends, namely those exerted upon it by other bodies. The motion of certain bodies is called "vital" only because the forces exerted upon them are subject to certain (variable) influences, which result from those arrangements and processes which we designate as "organism" and "life."

united oxygen of the hæmoglobin is used up, which is determined by spectral analysis.

Construction of Cells. Optically, the protoplasma appears perfectly homogeneous, nor have we any reason to infer a definite arrangement of physiologically different parts, except in those cells or cell derivatives devoted to special functions. Thus the optical differences in the striated muscular fibre, the visible arrangement in the interior of ganglionic cells, are regarded as inequalities; but in these cases we speak of protoplasma modified for the purpose of function.

The existence of an external involution or cell membrane can be proved only by the observation of a double contour; but even when this is found in objects after the action of reagents, it is no proof that the membrane was present during life.

Of the nature and functions of the *nucleus*, or even its physical qualities, little is known. Still less of the *nucleolus*.

Cell Genesis. The first opposition to the doctrine of Schwann—the formation of cells in a free blastema—was caused by the discovery of the segmentation of the vitellus, but it was Remak who first (1852) successfully asserted that in the development of the embryo the *only* mode of cell multiplication that could be discovered was that by division. The final proposition of Virchow (1855): "*omnis cellula e cellula*," may be considered the true basis of our present cell theory.

Cell genesis takes place by division, by budding or by endogenous development. In the latter case, cells arise and grow like embryos in the mother's womb; in the former modes, the mother cell divides into pieces which then represent the second generation. In the division of nucleated cells, the nucleus divides first; but not every division of the nucleus is followed by that of the cell also. No proof has yet been brought forward to show that nuclei can be formed except within cells. Before cells divide they have increased in size: the nature of cell multiplication consists in the power of assimilation.

The principle that cells multiply by division is incontrovertible. The segmentation of the ovum is an example quite unambiguous. But it is not so surely known if certain cells in the

grown organism are still able to multiply in this manner. Since we have become acquainted with the migration of the colorless blood-cells, doubts may arise whether other cells than these are capable of multiplying. With the exception of cartilage, in which cell division is as unequivocally visible as in the ovum, the tissues of the adult healthy organism present no absolute unmistakable signs of division. In cartilage we see the progeny of one mother imbedded in a cavity of a firm medium; in all other tissues, we cannot be absolutely certain that two or four closely approximated cells did originate from a previously existing mother of physiological equivalence. The cells may have immigrated from somewhere else. In that case it were reasonable to suppose that the colorless blood cells are destined for the regeneration of *all* tissues. Capillary vessels, it is true, can regenerate themselves, for we know that they send out filaments which in turn become capillaries. Not so with the connective tissue. As there is no doubt that (at least some of) the wandering cells of this tissue came from the blood, the question if the connective tissue substance be not always regenerated from this source, is still open. W. Young has expressed himself as certain of this in the case of an œdematous scrotum. The most interesting part of this question concerns the glandular and epithelial cells. Numerous authors have asserted the development of the latter from cells of the connective tissue (Burkhardt, Virchow, Förster); later Pagenstecher asserted their development from "exudation cells," Biesiadecki from white blood cells.

We make no apology for dwelling so long on this fundamental chapter, and only remark that we have skipped over all those parts of it which have no immediate connection with the *progress* of the science.

The Connective Substances. By Prof. A. Rollett, of Graz.—In so recent a discipline as histology, the discussion of its past achievements and present problems necessarily involves historical considerations. Usage applies the name of the connective substances to a series of tissues serving as the basis, support, or envelope of the higher tissues, and embracing the connective tissue proper, cartilage, osseous tissue, and the tex-

tures of the cornea and dentine, which are characterized by the fact that they contain a rather large amount of "intercellular substance," passive in character as compared with the cellular formations imbedded in it. The tissues of this group frequently psss one into the other by substitution or by genetic sequence; they appear moreover to be morphological equivalents, certain parts of nearly related animals often being constructed of different members of the group. Reichert (1845) first asserted their relationship. He assumed them to contain a matrix which results from the coalescence of cells or parts of cells with a formless intercellular substance; he believed the connective tissue proper to be without structure. Virchow (1850) and Donders called attention to the existence of cells even in mature connective tissue, and the former declared these connective tissue "corpuscles" to be analogues of the cells of cartilage and bone. According to Virchow, the intercellular substance in the different members of the series differs only chemically and contains variously shaped, but still identical, cells. This theory met with strong and persistent opposition from Henle, chiefly because it carried with it some errors due to the particular method of Virchow and his followers, especially the assumption of a system of canaliculi. The final result of the contest, however, was the demonstration that mature connective tissue still contains cells.

In the mean time the doctrine of Schwann had been thoroughly reformed, as indicated above, and in its new form exerted its influence on the views then entertained. Max Schultze attempted to show that the mass of the cartilage was not an intercellular substance in the old sense of a solidified effusion between the cells, but that it originated ready formed from the protoplasma of the cells. This called for renewed investigation of the genesis of bone also, and the fibrillary substance of connective tissue. In regard to the latter, Max Schultze indeed arrived at the conclusion that it arose from "the protoplasma of embryonic cells without cell-walls and approximated to coalescence;" only a thin layer of protoplasma remained around the nucleus as a membraneless connective tissue corpuscle. This is in substance the same doctrine which was developed independent of the German investiga-

tions by Beale in England. "According to Beale's peculiar terminology," says the author, "the connective tissue is originally composed of elementary parts (cells) consisting of 'germinal matter' (protoplasma); later, a part of the germinal matter is transmuted into 'formed material' (fibrillary substance of the connective tissue), which therefore formerly existed in the state of germinal matter and was formed at its expense." Beale asserted the same in the case of osseous and cartilaginous tissue. Waldeyer confirmed these views in his investigations on the process of ossification. It is evident that by the discovery of this mode of development we have gained insight into another kind of genetic agreement between the bone, cartilage and connective tissues than that indicated in Virchow's theory.

The author then alludes to the discoveries of v. Recklinghausen, Stricker, and Cohnheim on the wandering cells, their amœboid movements and locomotion, etc.: he speaks of the influence they must needs exert upon the general questions of this subject, and passes on to the description of the three typical tissues mentioned.

The microscopic morphological constituents of the connective tissue are *cells*, and *networks* and *trabeculae* formed by them, peculiar fine non-astomosing *connective tissue fibres* usually united in bundles, and lastly the *elastic fibres*, characterized by their resistance against reagents, frequently anastomosing, uniting into networks and laminæ. The discussion of the "amœboid" cells is left to the chapter on the blood. The permanent cells of the connective tissue are described as formed of a granular mass; some set off against the transparent ground substance at their borders like a fine granular cloud, others formed of a substance interspersed with larger strongly refracting granules. The latter are usually of an elongated shape; their nucleus is elliptical, light, bound by a double contour, or appears but indistinctly limited and covered uniformly by the granular mass. The finely granulated cells are provided either with a distinct, oval nucleus, or else their mass seems at one point to be collected in the form of a nucleus; they send out a variable number of processes of different length and thickness, by means of which they often

anastomose. In these finely granular cells slow changes of form can sometimes be observed after continued inspection; they are much more sluggish than those of the wandering cells, and lead to no appreciable locomotion. Electric shocks cause the cells with finely granular protoplasma to become more roundish and retract their processes into round nodules; but a subsequent return to their former state has never been observed. In the wandering cells, on the contrary, such shocks cause a change of movement, or sudden retraction of all processes, whereupon they soon resume their former movements.

In young animals and embryos, the cell substance is broader, often sends out branching processes, and we often meet with anastomosing stellate cells.

It becomes evident, from a survey of the various forms of cellular elements of the connective tissue, that we are dealing with a series of differently developed cells, the genetic connection and physiological attributes of which are questions for future investigation.

The forms of connective tissue. Aside from that which occurs in certain new-formations of parenchymatous appearance (the small cell sarcoma of Virchow) and comparable to embryonic tissue, the connective tissue occurs essentially in two divisions, one of which embraces those forms which consist of networks and trabeculae of cells, the other the fibrillary connective tissue, characterized by the presence of peculiar, never branching, fibres of collagenic substance. The former includes the gelatinous substance of the umbilical cord in the earlier embryonic periods, a very fine supporting and enveloping structure found in the retina and in the interior of the nervous centres, supporting and enveloping reticula in the lymphatic glands and lymphoid organs, etc. The fibrillary connective tissue (fibrous t.) the most widely distributed form in vertebrate animals, is that which at first bore that name exclusively: it is composed of fibres and cells,—the fibrous portion largely predominating, usually arranged in more or less parallel bundles, as in tendons, fasciæ, and the cutis. In serous membranes, the arrangement is peculiar, especially in the omentum, where the tissue occurs in a reticulated form, the

bundles which run in a thin membrane often dividing and reuniting so as to leave open meshes between them, the margins of which are sometimes actually bordered by continuous recurrent fibres. Another arrangement of the fibres is sometimes met with, in which the bundles are not parallel but run in all possible directions.

Concerning the interstices of the connective tissue, the author says: "He who investigates the arrangement of the connective tissue accurately cannot doubt that there are interfibrillary spaces in it. It is the simplest result of observation, that the collagenic substance of the connective tissue is not in all parts of a specimen in uniformly close contact, that it does not in all parts cohere with equal firmness." Respecting the wandering cells of the fibrous tissue, it would appear that they cannot traverse it in any direction they choose, but can only follow definite passages depending on the unequal distribution of a cementing substance. The latter, which is soluble in lime water, corresponds in chemical properties with mucin.

The question concerning the *genesis* of the fibrillary connective tissue is one of the most difficult in histology. The old view of Schwann that cells elongated by growth up into bundles of fibres, was subverted by that of Henle: an original homogeneous substance splits up into bundles and fibres, the cells enclosed in the former taking no part in the process (Virchow, Donders, Kölliker). Max Schultze and Beale and others look upon the gradually changing intercellular substance as the protoplasma of membraneless and closely approximated embryonic cells, a little of the protoplasma remaining around the nuclei to constitute the connective tissue corpuscles. The author describes the process thus: "In its development, a part or all of the cells contained in the embryonic origin of a connective tissue organ grow and elongate to form spindle cells of considerable length and at the same time move away from each other, by reason of the appearance either of at first a few, afterwards an ever increasing number of fibres between them, as in tendons, or of a greater mass of substance at first transparent and uninterruptedly striped, in which the fibres become visible, at a later period, as in the

omentum." According to him, the fibres originate at the expense of the connected mass "by a sort of coinage." So far, he thinks, the process can be shown with certainty; from a subsequent remark we gather, that the author also agrees in theory with the view above mentioned of M. Schultze and Beale.

Cartilage. We cannot enter into the details of this section. Respecting the development of cartilage, the author holds similar views to those expressed above in regard to connective tissue, and to those held by Schultze and Beale. The intercellular substance is not looked upon as a solidified homogeneous effusion between the cells, but as the result of a successive growth of cell capsules. In the beginning the cartilage consists of nothing but primordial cells without cell-walls; the chrondrogenic intercellular substance is of secondary origin. Each cell first produces a cell-wall or capsule, then another capsule or layer within the first, and so on, the outer capsules enlarging and gradually coalescing with each other so thoroughly that it is not always possible in mature cartilage to separate the concentric layers of its matrix even by means of reagents. The question is still open, whether these successive generations of capsules are new-formations from the surface of the cells, or the metamorphosed superficial layers of the cell-protoplasma itself. The latter opinion is advocated by Schultze, Brücke and Heidenhain (and, we must add, by Beale).

The fibres of reticular and fibro-cartilage are regarded as elastic fibres.

Osseous Tissue. The great part of this section is devoted to a clear and masterly description of the development of bone; it is not susceptive of a brief analysis, so that we must be content merely to indicate the position of the author. Whether the osseous tissue be developed from preformed cartilage, or from a membrane, or from periosteum, the immediate process of osteogenesis will be the same. The distinction of three varieties of development—intracartilaginous, intermembranous, and periosteal—may be made as regards the locality of the process; but in reality "we shall see that the osseous tissue in all these cases arises from essentially the same new-formation (osteogenic sub-

stance), and also that this connective-tissue-like germ-mass which precedes the osseous tissue proper, probably in all cases springs from the same germs." In the case of the primordial bones, the formation of osseous tissue is accompanied by the destruction of cartilage. At the line of ossification, between the preparatory layer of cartilage and the marrow, the region of calcified cartilage passes abruptly into a region of densely crowded, granulated cells, which are the derivative, not of the enlarged cartilage cells, but of the medullary cells of the (s. c. medullary) spaces next adjoining. These darkly granular cells are called *osteoblasts*, and are the immediate antecedents of the true bone tissue. The same layer of cells or osteoblasts precedes the formation of the tegumentary bones of the skull (intermembranous osteogenesis).—

The chapters which follow are: a general description of the Structural Elements of the Nervous System, by Max Schultze, the Tissue of the Organic Muscles, by J. Arnold, Nerve and Muscular Fibre, by W. Kühne, Muscular Fibres by Polarized Light, by E. Brücke. We are compelled to close our analysis of this important work for the present, but purpose to give a review of the chapters named upon the receipt of the second part of the book.

SOME OF THE REMOTE CAUSES OF DENTAL DECAY.

Read before the St. Louis Dental Society, by HENRY S CHASE.

It is well for us Practical Dentists to occasionally turn our thoughts beyond the proximate or immediate causes of dental decay which daily fall under our observation, to those remote influences produced by pre-natal causes, and acquired diatheses.

It is one of the wonderful but unexplained truths of nature that at the moment of conception the human embryo-germ is impressed with THAT which determines its anatomical, physiological, and psychological characteristics; but which are subsequently modified by the varying conditions of the mind and body of the mother.

The truth of this pre-natal impression is daily shown to us in the locomotive system, the facial lines, and mental characteristics of children.

"Like begets like." The observation of the world discovered this truth long before it heard of philosophy.

It is not often that children resemble one parent alone. They more generally, and probably always partake of some characteristics of both parents.

There is no controlling power at present known which would enable at will a father or mother to impart to the embryotic germ his or her own peculiarities of body or mind *alone*. Consequently it is not even known before birth, whether the child, when born, or grown to maturity, will resemble mostly the father or mother. It is often the case that the child will not, to the superficial observer, resemble either, but it may appear to resemble a grandparent more than its immediate parents.

We must bear in mind that resemblance means more than the shape of the head and expression of the face. Let us particularize a little. Mental peculiarities give expression to the face and to the general manners of the individual. There are peculiarities of hair, eyes, teeth, forehead, back head, facial bones, chest, abdomen, pelvis, legs, arms, fingers, toes, nails, &c., &c.

I think it probable that *both* parents *always* furnish *some* of these characteristics to offspring: at the same time that more remote blood relations furnish other resemblances. I believe that one parent may furnish the type of the maxillæ, and the other parent the teeth. I think that *observation* has taught us this fact.

I have sometimes seen a large framed man mated with a woman of small bony structures. The father has large roomy maxillæ, in which are located teeth corresponding in size. The mother has small maxillæ, corresponding to the remainder of her skeleton, and her small and delicate teeth have ample room. A child is born which matures with the jaws of the mother and the teeth of the father: consequently the dental arches are crowded, deformity results, and dental decay is likely to ensue unless the dentos is of the best and most enduring variety. If

calcification is imperfect in these teeth, or if dental decay existed in the progenitors to any extent at the time of conception, then caries may run riot in the crowded dentures of the offspring.

Observation has impressed upon me the belief, as I doubt not it has some of you present, that the present condition of the teeth of father or mother at the moment of conception, will nearly always be represented to a greater or less extent in the offspring.

I will mention a single case which came under my observation, which, owing to its peculiarities, is more interesting than usual, and gives a prominence to this subject which it well deserves:

A mother, at the conception of a daughter, had the right lateral incisor decayed on its right approximal surface. The cavity of decay was small, and it remained unplugged until after another daughter was born, when it was properly treated and plugged. This was the only decayed tooth, and the only one which had ever been decayed in the mouth of the mother up to this time. When about eighteen and twenty years of age respectively, these daughters became my patients, and I found the only defective teeth in their mouths to be the right upper lateral incisors, which were each decayed on their right approximal surfaces, and these I plugged, and at which time the elder one, a married woman, related their previous history.

If then the present condition of the teeth of parents exerts an influence on the ovum at the moment of conception which shall determine the character of the teeth of the child, how important it is that we should be made acquainted with the fact. Is it too much to presume that if the decayed teeth of father and mother are placed in a healthy condition before the conception of a new being, that the teeth of the latter will be of a more healthy structure and have less tendency to decay than if the teeth of the former were left in a carious state?

After conception, the new being is solely under the physiological influences of the mother. I cannot for a moment doubt that the teeth of the child during gestation are affected for good or evil by the degree of health possessed by the dental organs of the mother.

Besides this subtle and unexplained controlling power of the

mother over the child, there is the more obvious and easily explained influence of *nutrition*. Deriving as the embryo and child does, all the proximate principles of tissues from the blood of the mother, it is easy to understand why a deficient amount of inorganic elements in that fluid should cause defective calcification of the temporary or milk teeth.

Although no teeth are erupted until several months after birth, yet we must remember that the dental germs are among the very first formations of the human embryo. As early as the sixtieth day the bulbs of the under central incisors are formed. From the 85th to 100th day their caps of dentine may be seen; and from this time onward calcification of the dental tissue is in progress.

If mal-nutrition is present during the state of gestation the milk teeth must suffer. Mal-nutrition may be the result of a variety of causes.

The food of the mother may be constantly deficient in the phosphate and carbonate of lime.

On the other hand, the blood of the mother may be entirely physiological, and yet, from a greater or less pathological condition of the body, fail to be made into blood. Or, if made into blood, fail to be formed into solid tissues.

But calcification is not the only important process in the teeth of the unborn. An uninterrupted and *healthy* growth of the *basal* dental structure is quite of as much consequence as perfect hardening of these tissues.

The crowns, only, of the teeth of the first dentition are formed during pregnancy, but these crowns are in a soft pulpy condition, and grow from a simple cell into the perfect shape of the future tooth, before calcification of their exteriors is completed. The evolutions of that simple nucleated cell through the various forms which it takes until the dentine is formed is curious and interesting. This soft basal structure is that which receives the impress of various diseases to which the mother is subject while she carries the yet unborn child. The delicate processes necessary to evolve the dental germ into perfect dentine are interfered with, not only by the suspension of nutritive processes, but by

inflammatory states of the mother, and by those subtle dyscrasias which may not be accompanied by decided inflammation, but which depress the vital powers even to the gates of death.

(To be Continued.)

WHY DO THE TEETH DECAY?

Undoubtedly the all-wise Creator formed the teeth of *Our First Parents* in a perfect manner, not only as to shape, and adaptation to the food fit for human beings, but as to durability. They were intended to last as long as the remainder of the body. Doubtless for many generations they did not deteriorate in quality, but as luxuries crept into social life, and general diseases followed, consequent on breaking physiological laws, the teeth also suffered, and so these organs, being subject to interstitial change just as is the remainder of the body, bones and softer tissues, have partaken of the general dyscrasia, and come down to the present age with *imperfection* stamped upon them.

The *Brute Creation*, which has not thus violated the laws of nature, probably have as perfect teeth at this day, as they had in the first creation. Their young find the milk of the mother rich in the nutritive elements which will not only build up muscles and other soft tissues, but in those which give strength to the osseous system, and perfect calcification to the teeth.

On the other hand, the young of human parents often find the milk of the mother deficient in those elements which give hardness to the teeth and bones, as well as strength and vigor to the nervous and muscular system.

Nature with a bountiful hand has placed in all *natural* food, everything required by the human body for its growth and perfection. But thousands of mothers of our day live on food which has been deprived by man of its most valuable constituents. And so it is the same with children who are weaned. Those whose food, to the amount of 50 per cent, consists of something made of superfine flour, *must* suffer from imperfect nutrition of the teeth.

Parents should insist on it that their children not only eat nourishing food, but also that much of it shall be *hard*, requiring considerable effort in mastication.

A muscle will suffer from innutrition if it has not *action*. Its fibres must be put in daily motion to be healthy. So, too, of the teeth, they need *work*. The mastication of hard substances gives the periosteum of the roots a healthy stimulus, and healthy nutrition is the consequence.

Mastication of hard substances also expands the palatal arch, and thus is avoided the crowded condition of the teeth which is to be observed in the mouths of so many children of the present day.

Dental Irregularities are much more frequent in the city than in the country, owing to the more luxurious habits of city children. Crowded dentures more surely decay than those which give each tooth sufficient room for its work.

Health of mother and child, good food, and proper cleanliness of the dental organs, would go far to render dental caries much less common than it is now. This disease is so prevalent in the United States as to be really alarming, and it is the duty of every dentist to exert his influence in diffusing such information among his patients, and the community in general, as will tend in some measure to check this wholesale destruction of the beautiful and useful organs of mastication and speech.

E. C. Edsill.

La Porte City, Iowa.

Operative and Surgical Dentistry.

EXTRACTION AND REPLACEMENT OF TEETH.

This operation is not a new one. More than thirty years ago it was occasionally performed for the cure of toothache; the pulp being destroyed and removed before replacement of the

tooth. The replacement of teeth dislocated by accident is not at all uncommon now, and indeed a practitioner who should neglect or refuse to reinsert dislocated teeth would be severely censured.

Extraction and replacement have formerly been for the purpose of destroying and removing the dental pulp, and plugging the pulp cavities and roots with facility.

I do not remember to have seen any account of this operation for the purpose of curing alveolar abscess, until my attention was arrested by reading a case of this character in the October No. of the *Cosmos*, the details of which will be found in this Department.

Yesterday I stumbled upon the December *Cosmos* of 1860, and found an interesting case of Extraction and Replacement, reported by F. H. Guiwits of Avoca, N. Y.

He says, "In the winter of 1857 Dr. H. called at my office to have the right upper lateral incisor operated upon for exposed pulp." "He had a way of his own, he said, and desired me to treat it so." "In accordance with his request I extracted the tooth, clipped off a line of the end of the fang" and then proceeded to remove the pulp and its vessels. The cavities were all plugged and the tooth returned to its place in the jaw. The soreness subsided; the gum grew to the pericementum and in two weeks the tooth was firm and comfortable, and remained so up to the time of writing. This is the first case where amputation of the root was performed, in connection with the principal operation, that I have ever heard of.

All operations of this character should be performed with the utmost delicacy and care. The pericementum should not be abraded by placing the root in a vise unprotected. As near as possible keep the tooth at blood heat and the pericementum moist. I think it would be advisable generally to cut off about a line of the end of the roots, or even more if they are crooked, for the purpose of allowing the tooth to go more perfectly home.

Exostoses might render a root more difficult to replace in natural position. An exostosed bulb might with propriety be reduced in size with clean cutting instruments. The removal of the pericementum over the exostosed portion would not necessa-

rily be injurious. Teeth have become firm and healthy after having most of it scraped off.

The pericementum is not the only living portion of a tooth which has been extracted and had removed the whole of its pulp and vessels. The whole substance of the tooth, dentine, cementum and enamel, is all alive, and will not usually lose its vitality for twenty-four hours. Many cases are now on record where it has retained it for three days.

Highly organized beings lose their vitality much more readily than those of a lower order. Some reptiles live for hours after being decapitated; the turtle for instance. Union of lost or separate parts takes place easily in the lowest order of animal life. The same is also the case in vegetable life. The operation of grafting fruit trees is an example. The twigs of fruit trees which are to be grafted into other trees are often kept for months in a healthy condition, and ready to unite with other vegetable fibre when supplied with the blood (sap) of the plant. Dentos (cementum, dentine, enamel) has a very low order of vitality in comparison with muscle, or the dental pulp. Nutritive changes are not so rapid as they are in these, or even in bone. For this reason dentos has a more persistent vitality than any other tissue of the body. And the Dental Surgeon is able to take advantage of this, and perform operations of a character which the General Surgeon would consider absurd.

Can a tooth deprived of its pericementum renew this tissue under favorable circumstances? Undoubtedly. What is the basal substance of a tooth? It is the dentine tubes, the cementum cells and the enamel fibres *decalcified.*

Then it is *soft* tissue, receiving *nourishment* from the blood, which process involves the processes of change in the molecules of which the tissue is composed. Cells are born and die here momentarily, and vital processes are as constantly in operation as in the substance of a muscle. If the cementum cells can multiply themselves they can form pericementum, for I take it that the pericementum differs no more from the cementum itself than does the epidermis from the true skin. Connective tissue is the basal substance of both cementum and pericementum, (periosteum).

I can see no more difficulty in the cementum forming its own covering than in the dermis forming the epidermis.

Suppose a tooth to be extracted and replaced without destroying any portion of its pericementum; how does *union* take place in the process of recovery? Why the cells of the tissues in contact multiply themselves, and precipitate themselves into the breach; the cells of dental periosteum and alveolar periosteum mingle and differentiate into fibrous cells, and there is at once a fibrous connective tissue uniting the parts, and homologous with those parts.

If the pericementum was scraped from a portion of the root I see no difficulty in the same process taking place between cementum and alveolar periosteum, or even the bone cell of the alveolus itself.

It must be remembered that tissues are capable of changing the shape of the cells which are peculiar to them, and forming an entirely different tissue. There was metamorphosis of tissue when the simple cell which represented the future tooth lay in the primitive dental groove, and grew and multiplied, and formed cementum, dentine and enamel.

When opportunity occurs I hope members of our profession will try the experiment of even extracting molar teeth and replacing them for the cure of alveolar abscess, when other means fail to cure. At any rate, when extraction is decided on as the last means of relief, it will, in many cases, be advisable to try the experiment of replacement. I have never performed this operation, but shall do so at my earliest convenience.

Thickened pericementum, whether on the end of the root or on its sides, should be scraped off thoroughly. It might be well in some cases to cauterise the diseased parts, also, with carbolic acid. If dead pulp has caused the abscess, decomposed and diseased the whole structure of dentine and cementum, causing it to have a *dark* color, I would not recommend replacement, for more than likely its vitality is destroyed, or at least impaired to such extent that success would be very doubtful.

The replaced tooth should be supported by ligatures or other appliances suited to the circumstances. The jaws should also be

kept apart just enough to prevent occlusion of the replaced tooth with its opposite. Crown caps of gutta percha may be easily made and renewed, or formed of vulcanized rubber.

I should not hesitate to replace a root having one-third of its length amputated. The probable result would be that *bone* would be formed by the surrounding osteal tissues, and the vacant alveolus filled with it to the end of the root, giving the latter its natural support. Six or eight weeks would probably be the time required for the new growth.

A patient subject to this operation should be quiet; should not get excited by exercise, food or drink; for everything would depend on good physiological action of the system. If the powers of life were much depressed from any cause, then also the operation would be more likely to fail. C.

FILLING TEETH.

By H. Judd, M.D.

(Continued from page 445.)

Since writing the article upon this subject for the October Number, attention seems to have been directed to the use of heavy foils in filling teeth, and a majority of the best operators in this city have been experimenting upon this subject. Our own experience in this direction has not been very extensive, though we have been using Nos. ranging from 20 to 60 for the last two or three weeks. No. 20 works easily in all locations, in small cavities as well as in large, and is easily driven into any place where No. 2 will go, and I find that it is by no means necessary to lay it in smoothly, one sheet upon another, but it may be folded into smooth ribbons of two or three thicknesses, and then cut into square blocks, when it is ready for use; these pieces may be laid in smoothly when convenient, but they may also be gathered up and placed in the cavity in any shape, as one would a common pellet of No. 2, and it will be easily driven down smooth and solid. No. 60 we cut in pieces about one line

square or larger, and find them very tractable in any location where any other kind of foil is used. It is claimed by those who are the most enthusiastic in the use of these Nos. that more gold can be put into a cavity than when thinner foil is used, that it makes a better margin with an equal amount of care, and that it requires less labor to finish up a filling; and lastly, that it requires less time and labor to fill a tooth.

The future will determine whether the lower Nos. are doomed or not, and we will await its developments, though from the short experience that we have had ourself, and from what we can learn of others who have tried the heavy Nos., we think it highly probable that they will not again be cast aside.

In relation to the instruments to be used in filling teeth, we only insist that their serrations be short, fine and sharp. If the serrations are too long, it will be impossible to make a plug that will finish up with a good surface.

To fill a cavity with cylinders, place a cylinder loosely rolled against one of the walls of the cavity, in a perpendicular position if the cavity be upon the grinding surface of the crown. This should be held firmly in place by an assistant, or the operator may hold it himself with another instrument in his left hand. This should be well driven home by smart blows of a mallet. Another cylinder is then introduced and condensed in like manner, until the cavity is nearly filled, when the remaining part of the wall is to be lined by successive cylinders, and the filling finished by inserting cylinders, rolled hard, into the centre of those not yet consolidated until the cavity appears full. Next force a small conical steel instrument into the centre of those put in last, which have not yet been consolidated, and then introduce another cone or cylinder and repeat the process until this part of the filling has become so solid that an instrument can no longer be forced into it; then consolidate the surface thoroughly with a mallet plugger. The cylinders should always be long enough to project slightly above the margin of the cavity, so that they may be driven down well, in order to have a good surface to the plug when it is finished. In cavities favorably shaped for cylinder fillings, a filling can be put in in much less time with cylinders

than with pellets, and no method can secure a finer margin to the plug or a finer finish, but the practice of using very large cylinders is, as a general thing, objectionable. Filling with cylinders, adopted as a common method for all classes of cavities, is undoubtedly less practical, and far less to be depended upon, than filling with pellets.

(To be Continued.)

CICATRICES OF THE GUMS.

By G. V. Black, Jacksonville, Ills.

When the soft tissues are cut or wounded in any way, nature at once commences the work of repair. First, there is inflammation, which may be severe or slight, according to circumstances; if severe it interferes with or even prevents the work of reparation, but a certain degree, known to surgeons as "healthy inflammation," seems to be necessary to the conduction of the process.

The first notable sign that the process is proceeding is the appearance of small globular bodies of a florid color upon the margins of the wounds, called granules. These multiply and extend from the margins toward the centre of the hurt, until it is completely filled up, when they gradually assume the character of the tissues which they are intended to replace. This process is called *granulation*.

Following granulation, commencing likewise at the margins of the hurt, we have another process for the reproduction of the skin. There is a reduction of the inflammation, and a deposit of plasma or lymph is thrown out, which is rapidly organized into epithelial scales, or skin cells, producing a very thin and frail coating at first, but gradually thickening and extending until the wound is sealed up completely. This is called *cicatrization*, and the result a cicatrice, cicatrix or scar, which gradually assumes very nearly the appearance and functions of the normal skin.

When the processes are completed the inflammation subsides;

and as the amount of blood in the part is reduced to the standard of health, more or less contraction uniformly occurs, varying with the amount of congestion during the different stages of repair, without much reference to the agency by which the wound was produced, being more or less according to its extent. This tendency to contract continues for a considerable time after the wound is healed.

There is, however, in cicatrices a tendency to degeneration and abnormal contraction frequently producing hideous deformities when the scar is a large one. The cicatrices following burns, sloughing of the lips and cheeks from salivary and some other agencies, seem peculiarly prone to this degeneration.

THE GUMS are subject to the same laws in regard to cicatrization and contraction as other parts of the body, and their normal contraction, though sometimes of advantage, often works serious mischief.

The cases most apparent to the eye, occur in the lower jaw, when the teeth are all removed at or nearly the same time. In such a case a cicatrix is found extending from one angle of the jaw to the other, and when the mouth is ready for artificial teeth the operator will most likely find that the ridge, instead of standing squarely up, or projecting slighting forward, as would be expected from its former shape, really projects backward all around the anterior portion, with sometimes a fold of the gum stretched over the top of the ridge, backward, in which will be found a cicatrice in the form of a dense band or string.

Now, it must be evident to every one, that this cicatrix has a very considerable influence in shaping the ridge; and in the lower jaw especially its influence when excessive is very decidedly detrimental and should be guarded against. This is easily done if the operator can see his patient at the proper time, and simply divide the cicatrix in a number of places. It will sometimes be necessary to do this a number of times, but the operation is a very slight one and easily done.

In cases where the alveolar processes are very prominent the contraction of the cicatrice is often of much value. By drawing the gums firmly back against the anterior portion of the ridge, a

much greater shrinkage is induced than would otherwise occur.

I have sometimes thought this of sufficient importance to justify me in cutting out the septum of gum passing through between the teeth, so as to induce the formation of a broad and continuous cicatrice around a considerable portion of the arch, and have found it very effective in inducing shrinkage of the permanent parts.

The influence of cicatrices following the extraction of teeth, to which I wish to call especial attention, is in cases when the molars, or molar and one or more bicuspids are removed at once, or at short intervals, leaving the teeth in front. In these cases the contraction of the cicatrix formed in the wound is frequently sufficient to pull the gum loose from the tooth in front, giving rise to an inflammation that will not unfrequently cause the alveolus to waste away, in consequence of which the tooth loosens and finally falls out.

Of course this wasting is often from other causes, but I have watched it closely for a number of years and I am well satisfied that the contraction of the cicatrix is very frequently the primary cause. Every observant Dentist knows full well that the bicuspids in front of missing molars particularly where the back teeth have all been removed, often lose the gum and alveolus from their distal surfaces, even when they are kept very perfectly cleaned, and otherwise well cared for, and that too, in mouths not much given to inflammation or accumulations of calculus, and that these cases are very difficult to manage.

When the anterior teeth are removed we very seldom have trouble from this cause; for the reason that the cicatrix being circular, its contraction is accommodated by the central portions being drawn backward, thus reducing its area without interfering with its connection with the teeth. This is the reason why we have usually a more rapid and also a greater shrinkage of the central portions of a gap thus produced than near the remaining teeth, which I suppose most Dentists have noticed.

The treatment in case of removal of the back teeth should be preventive rather than curative. In the first place the Dentist should not extract the teeth so as to leave the mouth in such a

shape. If the molars are irreparably injured and the second bicuspid is involved in the ruin, even if nothing but the root remains, it should not be extracted if there is a reasonable chance of restoring it to any thing like comfortable health.

After the other teeth are removed this root should receive the best treatment practicable, and be filled in a manner calculated to keep it healthy as long as possible, as a protection to the useful tooth next in front, and if after the cicatrice formed by the removal of the molars is fully contracted, it is found necessary to remove the root, all is well, for a cicatrix the width of one tooth will not shrink enough to do much harm. If the root can remain permanently, it should be retained; it will be a considerable support to the tooth immediately in front, and will also keep the food that may be crushed, down back of the tooth, in chewing, from abrading and otherwise injuring the gum about its neck—an item of no mean importance.

It will often be found when the molars are in a ruined condition and the bicuspids capable of being restored to health, that the anterior root in the lower jaw, and the anterior buccal root in the upper jaw may be retained and made to serve as protectors to the second bicuspids. Much observation seems to show that these roots are much less liable to abscess than the others, and can generally be rendered healthy with but little trouble, indeed they will often assume and retain a healthy condition without any treatment whatever, though this should not be depended upon. If there was no such thing as the contraction of a cicatrix the retention of these roots would be advisable on account of the support they give to the adjoining teeth, and as a protection against injury to the gums by solid food being crushed down against them in mastication.

The contraction of a cicatrice often gives rise to accumulations of calculus by forming a favorable receptacle for it. My readers all know that around each tooth there is a free margin of gum rising a line or more above its attachment to the tooth's neck, which in health lies close against it.

Now, when the cicatrix begins to contract in any of the cases before mentioned, this free margin is pulled away from the

distal surface of the tooth in such a manner as to form a little cup, producing a most favorable lodging place for accumulations, and both act together to increase the trouble.

When the posterior teeth must be removed much may be done to remedy this difficulty. Of course it is important to charge the patient especially in regard to cleaning this locality. The position is such that unless especial pains be taken it will not be cleaned in brushing the teeth. The brush must be turned across the arch behind such teeth or their distal surface will remain unbrushed.

In these cases the best treatment I have been able to devise is to watch for the pulling of the margin of the gum away from the tooth, and when it occurs take a gum lancet and holding the point toward the tooth at an angle of about forty-five degrees with its axis, make a circular incision about one-third way around it about three lines from its neck, dividing the cicatrix completely.

Now the gums are very firmly attached to the periosteum, so that the wound does not spread very readily. In order to assist this take a small silk ligature and pass it between the tooth and its neighbor—if thought best, we may commence two or more teeth in front—carry the ligature back and catch it in the cut; which if rightly made will be found to hold it securely—bring the ends together and tie. By drawing the ligature moderately tight the gums may be drawn up closely about the neck of the tooth and held until the wound is partially healed when it may be removed.

If it is found impracticable to slip the gum up sufficiently the lancet blade may be introduced into the centre of the cut, and laying it flat with its point directed toward the tooth, the gum may be severed from the periosteum along to the top of the ridge, when it will be easily drawn to the proper position.

Care must be taken not to draw the thread too tight, for in that case the enclosed gum may slough out, increasing the difficulty we wish to remedy.

It will sometimes be found necessary to repeat this operation several times, during the shrinkage of a cicatrix; but it is so easily performed that this does not signify.

In cases where the wasting of the alveolus is fairly set in—classed as "receding of the gums and alveolar process," it is too late to apply this operation with success, as it will be likely to do harm by increasing the irritation.

ALVEOLAR ABSORPTION AND ITS TREATMENT.

Disease of the gums is the cause of alveolar absorption, and this disease may be induced from different causes. The first and greatest is negligence in not properly brushing the teeth and gums; food and salivary calculus, either combined or separate, irritate the gums, inducing congestion and inflammation, which destroys the periosteum and induces alveolar absorption.

It is not confined to any age; and is as often met with in robust as in delicate constitutions. There are other causes, such as vitiated secretions of the mucous membrane induced by ptyalism.

In a healthy mouth the gums closely embrace the teeth in regular festoons, neither yielding pus or blood upon pressure. Unfortunately few mouths are seen by the dentist which are not diseased.

Treatment. First remove all extraneous matter from around the teeth, and where the absorption has taken place as much as one or two lines remove the edge of the alveolar process with an instrument (particularly on the lingual surface of the superior molars); pay no attention to the bleeding of the gums. Then take granulated *chloride of zinc* and place upon a piece of glass as much as may be required to be used at one application. Place a napkin between the lip and lower teeth, with the head thrown back sufficiently to prevent the saliva from flowing over or between the teeth, then with the point of an excavator apply the zinc between the gums and teeth—being careful not to let it get outside of the gum or get on the lip; after applying to gums around three or four teeth, take another part of the napkin and press against the gums so as to prevent the zinc from flowing on the lip or gum; then give the patient water to rinse the mouth, holding the lip away from the gum until the water is in the mouth, instructing the patient to spit without rinsing the mouth.

In the same manner apply to the gums whenever diseased on the labial side.

It is not usually necessary to use the napkin on the surface of the inferior lingual gums. In the lingual superior the napkin should be placed in the mouth so as to prevent it running down the throat. Should it touch the lips in many mouths it will cause them to swell. With proper care there is not a probability of burning them. As regards how much and how often, that depends upon the disease. Applications at the start should be made every two days, and as the disease yields let it be longer between times. The florid gum will bear a larger amount of zinc at a time, and usually heals more rapidly than the pale or consumptive gum around the margin of which exudes a white sanious fluid upon pressure, resembling lac, with a white festoon line upon the superior front.

Much depends upon judgment; constitutional treatment seldom being necessary, as the disease is of a local character.

I have been using this treatment since 1855 with success. In healthy patients the gums not only heal, but the alveolar process is either in part or wholly restored, and teeth become tight in their sockets.

From 1855 to '60 I kept a record of cases, with the varied success attending this treatment, which I lost during the war. Since then I have not kept any regular record. I usually use from one to two dozen ounce bottles of zinc yearly, never using it after it deliquesces in the bottle, as it is more difficult to apply. If the gums are much diseased, the first application does not burn much, but afterwards it burns severely.

I have used iodine, creosote, tannin and glycerine, but have never found them to act satisfactorily.

The gums and alveolar processes should be treated upon the same principles as ulcers and diseased bones of the other parts of the body, remove foreign substances and fungous excrescences and the vis medicatrix naturæ will do the rest.

Sol. Horine.

Court Home, Mo.

RE-UNITING FRACTURED TEETH.

By Chas. R. E. Koch, Chicago, Ill.

Presuming that the article on "Fracture from Mastication," in the October number of the Mo. Dental Journal, was intended more as a hint of what *might* be done in such cases, than a statement of what actually has been performed by "C." in this direction, I desire to make a report of a case of similar nature in Dr. Kennicott's practice, in which I assisted him, which, although a partial failure, may yet be of interest to the profession.

Professor F., of one of the medical schools in this city, split off the buccal portion of the right second lower molar, the nerve of which had been destroyed; and roots, pulp cavity, and cavity of decay, extending from the anterior to posterior approximal surfaces, had been filled with gold eighteen years ago, by Dr. Kennicott.

The fracture embraced nearly one half of the crown, and extended about a half inch below the neck of the tooth, the gold filling in the lingual portion remaining firm.

A very thin platina wire was loosely put around the tooth, the crevice thoroughly cleansed and dried, and a thin paste of os artificiel introduced in it, and then the wire ring around the tooth was tightened until the detached portion was again in juxtaposition to the gold filling.

After the application of some carbolic acid and iodine to the edge of the gums, the patient was cautioned not to masticate on the tooth, and dismissed to call next day.

Next day two holes were drilled through the tooth and gold filling (in the thickest portion of the detached piece), which were screw cut with a tap previously prepared from an old instrument, and screws made of gold wire of proper size were driven in nearly to their heads, when a small quantity of os artificiel was put around the heads, and screws turned firmly home. The platina wire was then removed from around the tooth, and the protruding portions of the screws at the lingual surface were filed off and burnished.

The professor was highly pleased with the apparent success of the operation.

Some three months later, however, in masticating, the outer portion or plate broke in a line crossing one of the screws from above downward, (the tooth having been devitalized so long a time, its bone was undoubtedly much more frail than in cases of live or more recently devitalized teeth). It being the only "grinder" on that side, the patient could not lose the tooth. The broken portion was entirely removed, as also the gold filling and screws. A ring was fitted around the remainder of the tooth made of several layers of sheet tin, and fastened with wax-cement to the lingual surface, and projecting over it on the buccal side enough to embrace the original extent of the tooth. Os artificiel was then prepared *just as stiff as it could be worked, and firmly pressed* into this ring, allowing it to go down upon the roots quite below the edge of the gums. After this had sufficiently hardened—in about four hours—the tin band or ring was removed, and the filling polished. It was allowed to extend a considerable distance below the edge of the gums, which very soon seemed to hug as closely to the artificial bone as it ever does to a tooth. In a subsequent sitting several cavities were drilled in the grinding surface of the os filling, which were fitted with gold, to reinforce the os against mechanical attrition.

This is now a year ago, and within a few days I saw the case; the tooth was perfectly well, and its owner informed me that it performed duty fully as well as ever.

Here I wish to say that Dr. Kennicott informed me that this was not his first operation of rejoining fractured teeth, but that years ago he performed similar operations which proved successful, and some of the teeth so treated are now in use.

In reference to "C.'s" article I would ask: Would it be good practice in cases where *complete* separation has taken place, to destroy the nerve, i. e., devitalize by the usual method of application of arsenious acid?

Would there not be danger of the acid penetrating through the fissure and acting upon the surrounding tissues, and thus

cause the very thing we are trying to prevent,—the loss of the tooth?

It seems to me that it would be better to apply nothing but cold steel to the nerve in such a case; this can be aided by the previous use of ether or rhigoline spray in very nervous patients; of course, if the latter is used, it should be applied to a point farthest from the exposed nerve first, so that its direct effect will reach the exposure last, and thus severe pain, which would certainly follow a direct application, will be avoided.

Mechanical and Miscellaneous Department.

REPAIRING ARTIFICIAL WORK.

(*Continued from Page 454.*)

Case No. 4. Full upper set on gold, with a crack in the plate extending from the notch in the edge on the median line two-thirds of the way across to the posterior border; at a point in front the parts are separated one-eighth of an inch. After thoroughly cleansing the plate, bring the parts together and retain them by means of fine binding wire passed between and around the teeth from opposite sides. Cover the crack upon both the lingual and palatal surfaces of the plate with a strip of gold foil, bibulous paper, or a thin coating of pure beeswax, so as to keep the edges of the fissure free from the plaster used in investing the case.

It is the common practice to cover the entire palatine surface of the plate with the investing material, in the same manner as for soldering a case in the process of construction. But much the better plan is to allow none of the investment to cover any portion of the crack on either lingual or palatal surfaces, all other portions being covered *evenly* with a *thin* coating. By this means all parts of the case are protected from undue heat, while the danger of warping or springing of the plate by contraction of

the investing material is avoided. The edges of the plate along the line of fracture being exposed, are easily raised to a degree of heat sufficient to flow the solder as desired. When the investment is sufficiently hard, the covering previously placed over the fissure is removed, a coating of borax applied, and small bits of solder placed along the line of fracture on the lingual surface of the plate. If the plate be thin, it may be necessary to strengthen it at this point by overlaying the crack, especially the forward portion of it, with a narrow strip of plate. The borders of the strip should be beveled down to a feather edge, and adapted to the inequalities of the plate as nearly as possible. If the crack is to be covered, the strip of plate should be fitted, and small wire clamps adjusted to hold it in position, before investing the case. Heat up the case gradually; when nearly or quite red hot, remove from the fire, and bring it under the reducing flame of the blow-pipe, directing the flame first upon the lingual surface; when the solder has all flowed turn the case over and place two or three bits of solder on the palatine surface near the end of the crack in front. Throw the flame on this point until the solder flows, and then carry the heat along the line of the crack to the posterior portion, thus drawing the solder through from the lingual surface, and re-uniting the parts perfectly on both surfaces,—an end not usually attained by any other method. E.

(*To be Continued.*)

HINTS ON VULCANITE WORK.

In the October Number of the *American Journal of Dental Science* appears an article under the above title from the pen of Dr. I. B. Hodgkin, of Alexandria, Va., which has the ring of the true metal. The ideas the Doctor has so freely given to the profession, and which, he tells us, shall not be covered by a patent, we should be glad to give our readers in the Doctor's own language, did space permit; we shall, however, crack the nut and give the kernel.

The Doctor claims for his method all the advantages secured by the patented process of Messrs. Stuck & Owen, with the additional advantage of securing a better fitting plate with less time and labor. His method is substantially as follows:

The impression is taken in a mixture of plaster and sand (equal parts); the impression cup, an ordinary tin one, clean and bright, to facilitate the removal of the impression from the cup. When the impression is sufficiently hard it is removed from the cup by gently tapping on the handle, or by soaking it in water. The impression is then thoroughly dried, the border is raised, and a ridge built across the posterior edge with putty, instead of plaster, as in the Stuck & Owen process; a complete cup is thus formed for the reception of the melted metal. By making use of putty to form this cup time is saved, and the change in the form of the impression, caused by the expansion of the plaster used in forming the cup, is avoided. A smooth, undefaced model will be obtained by this method if the impression be thoroughly dried. No covering of sheet tin is wanted when close adaptation is desired.

A polished lingual surface to the plate is secured, when either a metallic or plaster model is used to vulcanize on, in the following manner:

When the case is ready for the flask, having the base plate no thicker than is desired for the vulcanite, and no surplus wax on the lingual surface of the teeth, place it in the lower half of the flask, letting the plaster come up over the cusps of the teeth. Oil slightly the lingual surface of the base plate, and take a plaster cast of this portion up to the teeth; when hard, remove it and burnish down on it a piece of the pure sheet tin; trim the tin so it will not quite reach the teeth—it should, however, come back to the posterior edge of the plate; place it on the base plate and nicely adjust it in position, using the burnisher if necessary. The space between the edge of the tin and the teeth permits the escape of the surplus rubber. Complete the flasking in the usual manner. Open the flask, remove every particle of wax or gutta percha, cut outlets for the surplus rubber by removing, with a knife, a small part of the entire surface of the plaster, commen-

cing shallow near the teeth and deepening as the edge of the flask is approached, instead of cutting grooves as is commonly done.

Pack in the ordinary way ; before closing the flask, polish the surface of the tin by rubbing it with a bit of soft, half-worn cotton cloth. If the rubber has been kept clean, and the process properly conducted, the plate will come forth from the flask with a polished lingual surface, except one-eighth of an inch along the edge of the plate next the teeth.

This process is peculiarly adapted for giving a polished surface to the rubber extending above the teeth, in cases where plain teeth are used.

Mounting the teeth in the usual manner, on either a plaster or metallic model, wax up as desired, cast plaster on the lingual surface, as suggested, and put also a temporary investment around the outside of the plate and teeth ; when this last has set, pass a thin instrument through it at the median line so that it may be taken off in two pieces without breaking it ; remove it, and adapt a strip of tin nicely to the surface of each ; let the strip be slightly longer at the front than the cast, that they may lap a little, adjust the strip nicely to the teeth and base plate, seeing that they do not come much above where the rubber is to be ; adapt the tin to the lingual surface, as suggested, and flask as usual, being careful to have the case clean and the rubber unsoiled ; close the flask slowly and perfectly. The result will be all that can be desired. E.

(*From L'Art Dentaire.*)

CURIOUS INFLUENCE OF CALOMEL UPON THE ERUPTION OF THE TEETH IN CHILDREN.

Translated by H. Judd, M. D., D. D. S.

It seems from a note inserted in *Le Récueil des Mémoires de Médicine et de Chirurgie Militaire*, by M. le Médecin Major de Première Classe, Champouillon, that calomel accelerates, in a manner as remarkable as unexpected, the evolution of the teeth in the first dentition.

Can this agent be an adjuvant to nature in case of difficult or tardy eruption of the teeth?

This is the first case in which M. Champouillon had observed the phenomenon of which it treats.

A little girl of eleven years of age, afflicted by an abscess of the anterior chamber of the right eye, in consequence of a blow received upon that part twelve days before, was put upon the use of calomel, following Law's method, in hope of determining or favoring the resorption of pus. Two days after the commencement of the medication the abscess had diminished, and the child was profusely salivated. At this time the central inferior incisors were the only teeth visible. On examining the condition of the mouth, our colleague observed, with astonishment, the two superior central incisors making their appearance, of whose approaching evolution there had been no sign before taking the calomel.

The gums were hot and tumefied. The calomel was continued, only two doses per day, however, one in the morning and another in the evening.

Two days afterwards the two inferior lateral incisors had pierced the gum, then the left superior lateral incisor showed itself a few hours later. The use of the calomel was suspended and replaced by the chlorate of potassa. Altogether five teeth had effected their eruption in four days.

Was it simply a coincidence? That is scarcely probable; and what seems to justify the hypothesis of a direct action of the calomel upon this strange evolution, is a fact analogous to the preceding one, and which we will briefly relate.

On the 17th of October, a child, twelve months old, was presented to M. Champouillon, having the right cornea obscured by an extravasation of recent date.

Upon examining, the two inferior central incisors were discovered, one of them already visible, the other upon the point of eruption. Upon the whole line of the alveolus there was no other sign of approaching eruption, no pain, no inferior maxillary swelling.

M. Champouillon gave the first dose of calomel that day. On the 19th the child had taken ten doses of calomel of a centi-

gramme each. Salivation supervened with slight swelling of the submaxillary ganglia, redness and softening of the gums.

The mercurial treatment was suspended because the condition of the eye was ameliorated.

Now, in the course of the day the superior central incisors appeared, then the superior lateral incisors followed the next day, the 20th, and on the 22d one inferior lateral incisor.

Here again five teeth had erupted in four days. Indeed if any one can report cases of eruption as prompt as these, it is certainly not usual to see them coincide with the taking of calomel, and stop immediately afterwards, although the group erupted remains incomplete and wanting in symmetry.

BOOK REVIEW.

A TREATISE ON THE DISEASES AND SURGERY OF THE MOUTH, JAWS AND ASSOCIATE PARTS. By James E. Garretson, M. D., D. D. S. Published by J. B. Lippencott & Co. 1869.

This is a neatly bound volume of 700 pages, which is intended to fill a hiatus in the literature of the Dental specialty that has hitherto been painfully apparent to all those who have aspired to honorable position in the ranks of the profession.

The very numerous class of diseases that are found in the oral cavity and upon the "associated parts" have hitherto been but very imperfectly described, and one has been obliged to consult many works upon general surgery to find what has been written upon many of these affections. Few dental practitioners have access to all the books required for such investigation. and, as a consequence, much ignorance has prevailed in the profession upon these subjects, and appeals to general practitioners have not, as a general thing, been attended with much benefit, as they give but little attention to the diseases of the mouth. We hope the profession will appreciate the labors of Dr. Garretson in bringing together the hitherto widely scattered literature of the diseases of the mouth, and also for laying before the profession the results of his own experience, which adds much to the value of the work.

We notice a growing *penchant* among the better qualified members of the fraternity, especially in the "great valley," for the performance of surgical operations; their perfect familiarity with the use of instruments and mechanical appliances undoubtedly gives them great advantages in this direction over their confrères in general practice.

The want of a medical education has more than counter-balanced this advantage hitherto, but this deficiency will not always exist; and indeed, in the last few years, two cases have come to my knowledge, in this State, where an inferior maxilla, in one case, and nearly an entire superior maxilla in another case, has been removed by dentists; the physicians in the neighborhood, though admitting the propriety of the operations, declining to perform them.

In view of this growing desire on the part of many members of the profession to fit themselves for surgical practice, we consider the appearance of this work peculiarly opportune. We hope to see it in the hands of every dental practitioner. J.

NEW DENTAL SOCIETY.

We are gratified to learn that the Dentists of the "Golden Shore" are moving in the direction of organization. We learn that a Society was organized at San Francisco on the 1st of September last.

The officers of the new Society are as follows:
President—C. C. Knowls.
Vice President—H. E. Knox.
Cor. Secretary—W. J. Younger.
Rec. Secretary—J. Ball.
Treasurer—F. A. Park.

Success attend these laudable efforts of our Western brethren.

We send, in this number of the Journal, bills to all of those whose names have been upon our books for the space of six months or more, and who have not yet paid their subscription for the current year. Many have anticipated us in this call, and we desire to express to them our appreciation of their thoughtful-

ness and interest manifested in this way in our behalf, and we are likewise greatly cheered by the words of encouragement which almost daily reach us, not only from the "great valley," but also from the Atlantic and Pacific slopes.

We shall be obliged to our friends if they will attend to these little bills before they are laid aside and forgotten, as we have paper, postage, and printer's bills to pay. But we shall most cheerfully labor ourselves to make the Journal acceptable to our readers, without any other recompense than a consciousness of having devoted our best energies in sustaining the interests and increasing the usefulness of the profession. J.

We will pay twenty-five cents per No. for each of the following back numbers of this Journal, viz: Nos. 2, 3, 4, 5, 6, and will consider it a great favor also to have them returned immediately.

Our printing house has lately been removed to a new and commodious building. The time necessarily occupied in removal, just at the time when the *Journal* should have been worked up, has delayed the appearance of this number.

We hope in the future for the prompt appearance of the Journal by the 15th of each month.

☞ Several communications from esteemed friends are unavoidably omitted for want of room.

MORTUARY STATISTICS.

Of Five Large Cities, for the Month of October, 1869.

Boston, ...	population	240,000,	deaths	440.
St. Louis, . . .	"	240,000,	"	440.
Chicago, ...	"	252,000,	"	594.
New Orleans, . .	"	200,000,	"	460.
Cincinnati, . . .	"	230,000,	"	305.

In proportion to the population, there was the greatest mortality in Chicago, and the least in Cincinnati. C.

ERRATA.—In October No., page 481, line 22, for "pear" read "pea."
Same No., page 485, line 7, for "10 years" read "18 years."

The Missouri Dental Journal.

A MONTHLY RECORD OF THE SCIENCE.

VOL. I.] DECEMBER, 1869. [No. 12.

OSTEO-SARCOMA.

Extracted from GARRETSON'S New Work on the Surgery of the Mouth, Jaws, &c.

However much—and it may be justly—the term osteo-sarcoma is abused, it still manages to hold its place in surgical nomenclature. Employed indiscriminately, as it long has been, it must certainly be perplexing enough to that class of professional men who study names and shadows rather than the substance of things; for, like the word epulis, osteo-sarcoma has been made to represent the most unlike pathological conditions, and the greatest diversity of features.

The term, as is seen, is a compound one, and is derived from the Greek *osteon*, signifying bone, and *sarx*, meaning flesh; and by those who created the term, could only have been intended to stand as the representative of a class of tumors which were fleshlike in appearance, either fleshy tumors in or upon bony structures, or a transformation of bone into fleshy substance.

I cannot say that, to me, the term seems such an ill one; it is certainly expressive; it is no fault of the word that men will misuse it. Be it as it may, however, there are so great a number of oral tumors which are made to come within its classification, that no direction of our study demands from us a closer understanding; and such understanding implies that we should look at the subject from every standpoint.

Osteo-sarcoma cannot, from its origin, apply to a strictly special disease; it is a noun of multitude, just as is epulis when it is used as a noun. We speak of the human face when we would direct attention to the countenance; so, also, we speak of the face

of a landscape, the face of the moon, or the face of things generally. Now, the word face is, without doubt, a very admirable word, but still it tells nothing of the many different kinds of faces. To be special, it must have some adjectival prefix. With such prefix we get every proper shading of the expression, and can employ it freely to our own satisfaction, and to the making of ourselves perfectly understood by others. Thus we say of one man that he has a bright face, of another that he has a dull face, etc. Osteo-sarcoma requires equal latitude. Thus we have a fleshy-looking tumor which is benign; and we have another which is malignant. Both of them are sarcomatous, inasmuch as they are fleshlike; yet they are very different kinds of tumors, so far as a prognosis would be concerned.

By the term "fleshlike," I do not, however, understand that muscle-like structure is specially implied; as all descriptions, however far back I have been able to go, seem to refer rather to an imperfect sort of fibrous or fibro-plastic tissue.

Prof. Gross, speaking of the diseases of the maxillary bones which seem to require the operation of excision, says they—the diseases—are generally described under the vague and unmeaning name of osteo-sarcoma, and constitute a group of affections defying every attempt at correct classification. That this declaration, he says, is not a mere assumption unsupported by facts, the writings of pathologists and surgeons abundantly testify.

Prof. Henry H. Smith, in his Surgery, page 483, thus writes on osteo-sarcoma: the bony and fleshy tumor, or osteo-sarcoma, is another ancient name, sometimes indiscriminately applied to a tumor analogous to spina ventosa. But these tumors are malignant in their character, and would be better designated as enchondromata, or as cancer of bone, the growth being generally due to a deposit of carcinomatous matter in the bone, causing an expansion both of its compact and cancellated tissue. In spina ventosa, he says, the greatest development is of the cancellated structure; while in osteo-sarcoma it is rather the compact layer and the external periosteum that are involved, the cancellated tissue being filled with a fleshy carcinomatous structure: while

the enlarged cells are sometimes also filled with limited effusions of blood, or a lardaceous, soft, pulpy deposit.

Mr. Fergusson says the non-malignant or benign tumors are represented by what Mr. Abernethy calls simple sarcoma. These are tumors of a solid fleshy character throughout; or they may consist of a bag or cyst, which contains fluid, or of a combination of these two, for there may be one cyst or more in a tumor whose general character is sarcomatous; and in another case a cyst may ultimately assume the appearance of a more solid growth.

Prof. Gross, in his work, "Gross on the Bones," defines osteo-sarcoma as an alteration of the osseous tissue, in which the substance of the bone is converted into a mass more or less analogous to cancer of the soft parts. The origin, he says, is, in most cases, referable to an hereditary disposition or to external violence; it generally comes on with deep-seated, lancinating pains, which continue a considerable time before there is any evident enlargement or swelling. The form of the tumor he describes as either smooth and circumscribed, or unequal, and, as it were, tuberculated, etc. For continuation of this paper, see his book, page 181.

Eustachius speaks of certain calcareous concretions deposited about the necks of the teeth (tartar or salivary calculi evidently), and Manget classes such concretions with the sarcomatous growth.

Prof. Dunglison, in his dictionary, defines osteo-sarcoma as a disease of the bony system, which consists in softening of its laminæ, and their transformation into a fleshy substance analogous to that of cancer, accompanied with general symptoms of cancerous affection.

Mr. Paget says the name of cartilaginous tumor may be given to those which Miller, in one of the most elaborate portions of his work on cancer, has named enchondroma. In a foot-note, Mr. Paget says another name employed for these tumors is benign osteo-sarcoma. In a second foot-note he says, under the vague name osteo-sarcoma many include together and seem to identify all growths in which bone is mingled with softer tissue.

Miller, in his "Principles of Surgery," says by the term

osteo-sarcoma is understood a tumor composed partly of bone and partly of fleshy substance, as the name implies: the latter constituent of a simple, non-malignant character. The formation is usually attributable to external injury, perhaps slight, and originates in the cancellous texture of the bone. The osseous part is analogous to the fibrous interlacement in tumors of the soft parts. It is, as it were, the stroma, in which the other constituent is deposited, dense and solid, centrally radiating in spiculæ outward, which always diverge and interlace, leaving interstices more or less wide, in which the fleshy substance is deposited, etc. See page 442 for differences, as given by this author, between osteo-sarcoma and enchondroma and osteo-cephaloma, etc.

Lebert places the whole class among the cancroid growths, and denies that tendency to return furnishes any sufficient evidence of a cancerous origin.

Miller, in another part of his "Principles of Surgery," says he desires candidly to admit that the class is "not certainly a well-defined one. It has been doubted, he says, whether some variety of these fibro-plastic growths would not be more properly classed among the malignant tumors, as they have been found prone to return, after excision, with singular obstinacy.

Spina ventosa, as remarked by Prof. Smith, is freely enough confounded with the osteo-sarcomatous growths. Now, the first is a term meant to imply an empty cyst, such as on a previous page I described as simple cysts: ventosa, a word from the Arabic, signifying windy; while the latter implies a solid, or comparatively solid, tumor. This definition differs, I am aware, from that given by Prof. Smith; but I employ the term, and recognize it only in accordance with its literal meaning. If, then, spina ventosa means a sharply-defined empty cyst, or, to give another definition to the prefix spina, "a cystic tumor accompanied with pricking pains," then it cannot simulate so as not to be recognized.

And so I might go on through all the authors upon my shelves—each one describes the disease, but classifies it differently. A review which I made of many authors reminded me graphically of Brummacher's impressive anecdote of the bringing

of the priests from the Babylonian war by Alexander: "Bild und Zeichen ist nicht das Wesen." But I have quoted enough—and have chosen authors presumed to be familiar to my readers—to exhibit the confusion that exists in the nomenclature of this direction of the maxillary tumors, and to excuse me, I trust, from any appearance of egotism in choosing my own terms and my own way to describe these diseases. I do not know that I shall succeed better than many others in making myself understood, but I shall, at least, adhere strictly to the text, and map out the tumors as I have met with them in practice.

I choose, then, the compound osteo-sarcoma, and I mean the term to apply to a class, and not a species. I mean it to stand as the representative of any tumor in or upon bone, which is osseo-fibro-plastic. Let that tumor be benign or malignant—this proposition is to be distinctly borne in mind.

Osteo-sarcomatous, or osteo-fibro-plastic (synonymous) tumors are to be esteemed doubtful growths. Thus I have seen two or more alike, to the unassisted eye; yet one has succumbed readily to treatment, while the others have bid defiance to every operative proceeding, and have gone on to the destruction of the patients. In minute structure (pathological character) such tumors must have, of course, varied greatly.

The fibrous tumors of the jaws described by Mr. Paget—see his Lectures on Surgical Pathology—I would class with the osteo-sarcomatous; so also the growth which he describes as myeloid. (See same Lectures.) Of the first, he says, as to situation and convenience, the fibrous tumors of the jaws may be found isolated and circumscribed, growing within the jaw, divorcing and expanding its walls, and capable of enucleation; but in a large number of these tumors, the periosteum, with or without the bone itself, is involved, or included in the outgrowing mass. In the case of the upper jaw, either the periosteum or the fibro-mucous membrane of the antrum, or nasal walls, or both these, may be included in such a tumor. In all these cases the tumor lies close upon the bone, and cannot be cleanly, or without damage to it, separated, except on the outer surface; commonly, indeed, bony growths extend from the involved bone into the tumor;

and sometimes the greater part of the bone is as if broken up in the substance of the tumor.

The character of these growths, Mr. Paget remarks, is easily recognized in the fibrous tumors of the gums and alveoli.

In the chapter on the Epulides, I referred to a tumor which is a fibrous outgrowth from the alveolo-dental periosteum. This same class of growths spring from the lining membrane of the sinus maxillare, and enlarging, dispart the bones, bulging out as a tumor upon the face: they are osteo-sarcomatous tumors, or, it would be more correct to say, sarcomatous tumors, purely fibro-plastic in structure, and perhaps exclusively benign. Such growths, if early and properly removed, are not apt to return. I have met with these tumors over and again; they always seemed to me to have association with the bone only, when such association was forced, as it were, on them. Such tumors are exclusively periosteal in their immediate relationship. I have examined them with the microscope, but have found them made up almost exclusively of simple fibrous tissues. If these tumors have not advanced too far, you will see them, on taking away the outer wall of the antrum, as some foreign body which has been impacted closely within the part; they have not the slightest pathological association with the bones, if we except their periosteal pedicel or base. Indeed, such seems the tendency to exclusiveness, on the part of these growths, that I have seen them when they were as large as a fœtal head, the integument of the cheek alone covering them, the bone which must have originally formed their external envelope having completely disappeared through absorption.*

The myeloid tumors of Mr. Paget seem to me justly classible with the sarcomatous, inasmuch as they so closely resemble fibro-plastic structures as to lead to the inference that such portions as seem marrow-like are rather the result of retrograde metamorphosis—a metamorphosis in the medullary type of carcinoma—than of original pathological development. It was on account of their being made up of the fiber cell that M. Lebert gave such growths the name "fibro-plastic."

* These tumors are not the polypi of the antrum.

I do not, however, presume to dispute pathology with Mr. Paget: so far as the purpose of our present classification is concerned, I have only to do with the fleshy appearance of these tumors. Minutely they may have been made up of marrow-like substances, but if in general appearance they are fibro-plastic or fleshlike, then they belong to the class sarcomatous, or, when found associated with bony tissue, osteo-sarcomatous.

A myeloid, says Mr. Paget, like a fibrous tumor, may be either inclosed in a bone whose walls are expanded round it, or, more rarely, it is closely set on the surface of a bone, confused with its periosteum. The sketches of fibrous tumors pictured in his Surgical Pathology, page 406, might, he says, be repeated for myeloid tumors.

Mr. Paget sets down these two kinds of tumors as being equally common to the jaws, both the superior and inferior.

When, he says, the myeloid is inclosed in bone, the tumors usually tend to the ovoid or spherical shape, and are well defined, if not invested with distinct thin capsules; seated on bone, they are (as exemplified by the epulic structures) much less defined, less regular in shape, and often deeply lobed. They feel like uniformly compact masses, but are in different instances variously consistent. The most characteristic examples are firm, and (if by the name we may imply such a character as that of the muscular substance of a mammalian heart) they may be called fleshy. Others, he says, are softer, in several gradations, to the softness of size gelatin, or to that of a section of granulations. Even the firmer are brittle, easily crushed or broken, they are not tough, nor very elastic, like the fibro-cellular or fibrous tumors, neither are they grumous or pulpy, neither do they show a fibrous or granular structure on their cut or broken surfaces.

Mr. Paget describes sections of these tumors as appearing smooth, uniform, compact, shining, succulent, with a yellowish, not a creamy fluid. A peculiar appearance, he says, is given commonly to them, by the cut surface presenting blotches of a dark or livid crimson, or of a brownish or lighter blood color, or of a pale pink, or of all these tints mingled on the grayish-white or greenish basis color. (In a foot-note, Mr. Paget quotes from

Lebert, who says the greenish yellow color that may show depends on a peculiar fat, xanthose.) The tumors, he says again, may all be pale, or have only a few points of ruddy blotching, or the cut surface may be nearly all suffused, or even the whole substance may have a full modena or crimson tinge, like the ruddy color of a heart, or that of the parenchyma of a spleen. Mr. Paget believes that many of what have been named spleenlike tumors of the jaws have been of this kind. The color they present, he says, is not due merely to blood in them; some of it is appropriate to their texture, as is that of the spleen or that of granulations, and it may be quickly and completely bleached with alcohol.

The following are the microscopic appearances which Mr. Paget says are peculiar to the myeloid growth, being initiated in no other morbid structure.

1. Cells of oval, lanceolate or angular shape, or elongated and attenuated like fiber cells, or caudate cells, having dimly dotted contents, with single nuclei and nucleoli.

2. Free nuclei, such as may have escaped from the cells, and among those some that appear enlarged and elliptical, or variously angular, or are elongated toward the same shapes as the lanceolate and caudate cells, and seem as if they were assuming the character of cells.

3. The most peculiar form; large, round, oval, or flask-shaped, or irregular cells or cell-like masses, or thin disks or clear or dimly granular substance, measuring from one three-hundredth to one-thousandth of an inch in diameter, and containing two to ten or more oval, clear, and nucleolated nuclei.*

Corpuscles, such as these, irregularly and in diverse proportions, imbedded in a dimly granular substance, make up the mass of a myeloid tumor. They may be mingled with molecular matter, or the mass they compose may be traversed with filaments or with bundles of fibro-cellular tissue and blood-vessels, but their essential features (and especially those of the many-nucleated corpuscles) are rarely observed.

Many varieties of aspect (as remarked by Mr. Paget) may thus

* These microscopic elements, as referred to in the chapter on Epulis are presented on page 449 of the "Surgical Pathology."

be observed in myeloid tumors, and beyond these they may even be so changed that the microscope may be essential to their diagnosis. After they partially ossify, well-formed cancellous bone being developed in them, cysts, also filled with bloody or serous fluids, may be formed in them, occupying much of their volume, or even almost excluding the solid texture.

Mr. Paget says he lately amputated the leg of a woman, twenty-four years old, for what was supposed to be a cancerous tumor growing within the head of the tibia. She had pain in the part for eighteen months, and increasing swelling for ten months, and it was plain that the bone was expanded and wasted around some soft growth within.

On section, after removal, the head of the tibia, including its articular face, appeared expanded into a rounded cyst or sac, about three and a half inches in diameter, the walls of which were formed by this flexible bone and periosteum, and by the articular cartilages above; within there was little more than a few bands or columns of bone, among a disorderly collection of cysts filled with blood, or blood-colored serous fluids. The walls of most of the cysts were thin and pellucid: those of others were thicker, soft, and brownish yellow, like the substance of some medullary cancers, a likeness to which was yet more marked in a small solid portion of tumor, which, though very firm, and looking fibrous, was pure white and brainlike.

None, Mr. Paget says, who examined this disease with the naked eye alone, felt any doubt that it was an example of medullary cancer, with cysts abundantly formed in it. But on minute investigation, none but the elements of the myeloid tumors could be found in it; these, copiously imbedded in a dimly granular substance, appeared to form the substance of the cyst walls, and of whatever solid material existed between them. The white brainlike mass was apparently composed of similar elements in a state of advanced fatty degeneration, but neither in it nor in any other part could be found a semblance of cancer cell.

Mr. Paget fails to inform us as to a return of the disease; it does seem to me that in the present state of our knowledge of cancer growths, it would have been a very difficult matter to have

classed such a tumor with the non-malignant. It certainly was very heteroclitic in character, and whatever we individually may feel disposed to think of such a structure, it serves to exhibit the merging of the benign into the malignant, and their relationship. A consideration of such cases as this should serve to keep the practitioner on his guard, preventing his being too confident in any prognosis he may give to a patient.

An epitome of the myeloid may thus be presented :

They are a class of fleshy tumors called by M. Lebert fibro-plastic, because, he says, they are made up of fiber cells. They are called myeloid by Mr. Paget, because he thinks they much more resemble marrow than fibrous tissue.*

In character, according even to Mr. Paget, they vary from simple semi-fibrous, semi-marrow-like structures to those so heteroclitic that they seem to merge into the medullary.

Their favorite seat seems to be about the bones, either intra or extra, being, perhaps, more common to the maxillæ than in the other osseous structures.

They are growths which usually occur singly, they are more frequent in youth, and very rare after middle age ; they generally grow slowly and without pain, and usually commence without any known cause, such as injury or hereditary disposition.

According to Mr. Paget, they rarely, except in portions, become osseous ; they have no proneness to ulcerate or protrude ; they seem to bear even considerable injury without becoming exuberant; they may shrink or cease to grow ; they are not apt to recur after complete removal, nor have they in general any features of malignant disease.

Since writing the above I have accidentally fallen upon a classification of the tumors of the upper jaw, made by Mr. Hancock. After alluding to various classes, he says : " In addition to these, Mr. Paget adds what he terms myeloid tumors of the part; but while the examples he quotes resemble on the one hand so much the fibrous, on the other the medullary tumors, their true char-

* Mr. Paget does not call all fibro-plastic tumors myeloid ; he only says a myeloid is different from the ordinary fibro-plastic of Lebert.

acter, whether innocent or malignant, is so very doubtful that I should hesitate in admitting them as a distinct class."

I am pleased to quote this from Mr. Hancock. There are already quite enough subdivisions without counting in such as can be done very well without. Indeed, it is because I so prefer a general, tangible, rather than a hair-splitting classification, that I am disposed to stick to the embracing term of sarcoma. I understand pretty well what one means when he tells me of an osteo-sarcomatous form of growth; he has only further to tell me whether it was benign, disposed to malignancy, or already malignant, and I understand exactly what he means.

Fibrous tumors proper, and the fibro-plastic, have general features in common,—that is, they belong to the class of sarcomatous growth; but then, in a pathological sense, they have such differences that an epitome, at least, of their history should be reviewed by us.

In some instances, fibrous tumors are seen under the microscope to have a concentric development; this species is slowest of growth, is most benign, and never attains any great size.

In another species the fibers interlace in a most complicated and irregular manner. This kind attains the largest size, and seems striding toward the heteroclitic.

A third class consists of an aggregate of nodules, and is compared by Dr. Humphrey to a conglomerated gland; the tumor being made up of small masses closely compressed together, having an uneven, knotty outline.

Fibrous tumors affecting the bones (Braithwaite) are usually found upon those of a spongy nature, upon the ends of the long bones, the phalanges, pelvis and lower jaw. (I will take the liberty here to correct the author. I have described these tumors as associated with the alveoli, with the external periosteum, and with the antrum of Highmore, and I know that they do thus affect *both* jaws, as I have met with them often enough practically, and so has every one who has any extent of experience.) So far, says this author, as I have met with them, they are confined to the exterior of the lower jaw, growing from the periosteum and creeping along the surface of the bone in such a manner as to

prove almost to a certainty that they originate in some morbid condition of the periosteal fibers. The bone underneath these tumors may suffer absorption in consequence of the pressure produced, but does not seem to be affected in any other way. They appear upon the maxillary bone more frequently than upon any other part of the skeleton. On the lower jaw they spread along the ramus, encircling it beneath and on the sides, so that the bone is almost concealed by the tumor. In some instances they form within the substance of the jaw, probably from the alveolo-dental membrane, and as they increase, the walls of the bone become spread out over them. They grow up around the teeth, and when they project into the mouth may be soft and fungous.*

In some instances the fibrous tumors of the jaws exhibit a semi-cartilaginous structure, and now and then fibers or plates of bone are formed in various parts of them. The progress of the disease is well illustrated by a series of tumors of the jaws in the College of Surgeons, London, from the museum of the late Mr. Liston. These preparations serve to show how necessary it is to bear in mind the mode of growth of these periosteal fibrous tumors of the jaws, because from their disposition to creep along the surface of the bone, whether it be an endosteum or periosteum, they are liable to return after removal, unless the immediately adjacent as well as the affected parts be excised. The histories attached to the specimens teach that very large fibrous tumors, both of the upper and lower jaws, together with the bones on which, or in which, they grow, may be successfully removed.

Now, as to the degeneration of sarcomatous tumors, it is, I think, a question beyond doubt that a tendency, greater or less, to retrograde metamorphosis belongs to this class. I need only instance the myeloid growths of Mr. Paget, just considered. Certainly nothing could more closely resemble medullary cancer, in, we may say, its incipient stage. And what are we to under-

* Presenting this phase the tumor may be classed with the epulic, but it is seen that on this account, there need be no confusion. Many epulic tumors are osteo-sarcomatous.

stand of the recurring fibrous tumors, if there is no carcinomatous association.

Concerning the diagnosis of the sarcomatous tumors, and the ability to follow them through their gradations, it seems most important that we should not be ignorant of the distinguishing signs that exist.

I remarked that osteo-sarcoma was not unfrequently confounded with spina ventosa. Now the point at which these two different conditions most nearly approach each other is in the hydatid and other cysto-sarcomatous growths.

Cysto-sarcoma, as implied by the prefix, is a tumor of only semi-solidity, its interior, or stroma, being made up of cysts and fleshy substance. These cysts are original formations, and not of secondary character,—that is, they are not the result of molecular disintegration. They are lined sacs, having a distinct secretory membrane. Miller describes the contents of these cysts as widely differing, and which every one must have observed: "They are more or less fluid, sometimes a clear gluey liquid, sometimes a gelatinous, pale mass of semi-solid consistence, elastic, and projecting beyond the level of the cut cyst on a section being made; sometimes a solid, consisting of a fibrous deposit, organized very imperfectly, if at all; sometimes of an exanthematous or poppy consistence, as in many encysted tumors; sometimes, but more rarely, a dark fluid, like printer's ink, is contained; sometimes blood is mingled with the contents, either in the solid or in the coagulated form."

The very nearest approach, however, made by cysto-sarcoma to spina ventosa, is in that class, very well named by some one, as I remember to have seen, the "cysto-succulent." These are sarcomatous tumors, the stroma of which is made up of very loose fibro-cellular tissue. They might well, in their contents, be likened to that of a water-melon, solid enough on section, but compressible to a few shreds. The fibrous contents of the stroma are, however, always a distinguishing sign. These tumors are very rare, and particularly so about the bony structures.

Müller has described a variety of these cysts of sarcomatous growth, which he calls cysto-sarcoma phyllodes. "The tumor,"

he says, "forms a large firm mass, with a more or less uneven surface. The fibrous substance, which constitutes a greater part of it, is of a grayish-white color, extremely hard, and as firm as fibro-cartilage. Large portions of the tumor are made up entirely of this mass, but in some parts are cavities or clefts, not lined with a distinct membrane (an exception to the rule of cystic tumors). These cavities contain but little fluid, for either their parietes, which are hard, like fibro-cartilage, and finely polished, lie in close apposition with each other, or a number of firm, irregular laminæ sprout from the mass and from the walls of the fissures, or excrescences of foliated or wart-like form sprout from the bottom of the cavities and fill up the interior. These excrescences are perfectly smooth on their surfaces, and never contain cysts or cells. The laminæ lie very irregularly and project into the cavities and fissures like the folds of the psalterium in the interior of the third stomach of ruminant animals. Sometimes the laminæ are but small, and the warty excrescences from the cysts are very large, while, in other instances, both are greatly developed."

Cartilaginous, or the enchondromatous tumors of Müller, might, perhaps, for all practical purposes, be classified with the sarcomatous, for while it might demand some little stretch of the imagination to convert a cartilage into looking like a fleshy mass, yet surgically the species are very much alike,—that is, both are reasonably benign, both are little amenable to the action of the sorbefacients, and both are better treated by the knife than in any other way.

As we understand the osteo-sarcomatous tumors proper to be outgrowths associated commonly with periosteal membranes, so we are led naturally to ask ourselves as to the cause of their formation. This I conceive to be twofold: first, as the result of local irritation; second, as the result of constitutional conditions; and, still again, we may combine these two, laying the predisposing cause on the one and the exciting on the other.

My attention was once directed by William Gibson, late Professor of Surgery in the University of Pennsylvania, to a case markedly illustrative of this latter condition. An old gentleman,

Mr. F., seventy years of age, was struck on the cheek by a stone. He soon had growing from the side of the injury a tumor, diagnosed by Professor G. as osteo-sarcomatous. The growth of the body was so rapid and so formidable as to incline to the view of its intimate relationship with malignancy. No one would, I think, doubt the twofold relation of such a tumor.

When osteo-sarcoma takes on this rapid growth, its innocency may always be doubted; when the development is slow and regular, and particularly if the origin can be traced to some local irritant, extirpation may be expected to result in a complete cure.

When these tumors are fairly and openly benign, we find no constitutional disturbance associated with them, at least none that are outside of strictly mechanical influences.

Osteo, or simple sarcomatous tumors of the sinus maxillare, should not be mistaken, as has too often been the case, for polypi of the nares. It sometimes happens that these tumors, particularly the softer kinds, find their way through the outlet of the sinus into the nostril, and there simulate very closely a common fibrous polypus; such tumors have been often highly aggravated by operations founded on such mistaken diagnosis. Again, polypi of the nostrils may find their way through the same passage into the sinus, and, enlarging, represent very fairly the ordinary sarcomatous tumor of the cavity. Now, pathologically speaking, being about one and the same thing, it would be little difference where or how the growth should develop, but as operative proceedings are concerned, a mistake of the kind becomes quite an awkward matter.

As regards changes common to the sarcomatous tumors, they may be considered under the heads of softening, suppuration, and malignant degeneration.

Softening, says Dr. Humphrey, appears to take place in two ways:

First, as a chronic process, affecting some circumscribed portion of the tumor, which is usually at or near the centre. The change is observed to commence with a slight discoloration, a yellowish or dark tinge, which is followed by a loosening or incipient disintegration of the structure; at the same time a line of

demarkation is formed around the altered portion, which becomes separated, like a sequestrum, from the surrounding mass. Both the detached portion and the cavity are at first rough and thready on their opposed surface; the former undergoes still further disintegration and solution, becoming broken up into a number of smaller fragments, which float about in a dark, dirty, turbid fluid, and which may ultimately disappear.

The process of destruction may go on in the adjacent portion of the tumor, enlarging the central cavity, till the whole is reduced to a fluid or a semi-fluid mass, walled in by the capsule of the tumor, which now stands in the relation of a cyst wall to the disorganized contents.

In some cases the softening process is completed without extending the circumference; the ragged processes hanging into the interior of the cavity are removed. The latter require a smooth lining, and look like a simple cyst lying in the cavity of the tumor.

A second mode in which softening takes place is more rapid and diffused, the whole or the greater portion of the tumor being affected at once. The change commences with the infiltration into the mass of a serous fluid whereby its texture is loosened and its components separated, at the same time the tissue of the tumor is softened, and interstitial absorption is set up in it.

As the result of these processes combined, the tumor is soon broken up into detached fragments, and reduced to a diffluent pulp, or it may be completely liquefied. These changes, Dr. Humphrey suggests, "are occasioned by some altered nutrition analogous to inflammation; they may be induced by some accidental cause, or as an injury; nevertheless they are not necessarily attended with any constitutional disturbance at all corresponding with the extensive destruction which is in progress."

Operative and Surgical Dentistry.

FRACTURE OF SUPERIOR MAXILLA.

By P. T. Smith, D. D. S., Iowa City, Iowa.

B., A lad of 15 years of age, was brought to my office by his father and an attending physician, on May 24th, 1869, suffering with comminuted fracture of the superior maxilla.

The accident had been occasioned by the kick of a horse, two days before. The foot causing the accident wore a sharp-toed shoe. The toe made a gash through the integument from a point near the second inferior molar—right side—extending upward and forward, opening into the mouth half way between the nose and angle of the lips. This incision had been brought together and fastened with stitches, by the attending physician. The parts being badly swollen they were examined with much difficulty.

All the teeth on the left side from the mesial line to the second bicuspid, their external alveolar wall, and some of the integuments, were carried away. Also the teeth on the right side from the lateral incisor to the second molar—with their hard and soft external boundary also gone. The remaining central and lateral incisors were comparatively firm in their sockets.

A large piece of os-maxillare—the fracture of which extended from the place of left cuspid up to the floor of the nasal canal across above the apices of the two remaining teeth on right side, and downward, communicating with the palatine gum at the place of the first molar, thence running back to the articulation with the anterior border of the horizontal plate of the palatine bone, forming an obtuse angle posteriorly across the median line and forward to the point first described—caused the bone thus detached, with the two remaining teeth, to hang loosely in the mouth, held only by the mucous membrane posteriorly as by a hinge.

These two remaining teeth were too loose and sore to warrant their employment in securing the detached bone to its place.

A piece about the size of a silver dime was cut from aluminum and a cushionet of caoutchouc secured on its intended superior surface. Two strips of the same material, each a half inch wide, were riveted to the padded piece, diverging as they passed forward to the two teeth, where they were bent to pass close to, but not touching them, passing outward and upward over the margin of the upper lip, one passing on either side of the nose close to the inequalities of the face, to a point just below the inferior border of the orbital ridge. Hooks were here formed for the reception of a rubber cord to be fastened above to an oil-cloth cap, made to fit the head tightly.

To prevent the two metal strips from being drawn towards each other, and out of place, a cross-bar was fastened to them, passing over the lips just below the nose.

The appliance thus made and placed in position, with the cushionet resting just back of the alveolus, and made so as to incline posteriorly in proportion to the upward pressure, held the fractured bone and remaining teeth snugly to their place, and offering no obstacle to the patient closing his mouth, or to the introduction of food.

The patient was directed to wear this for two weeks, at the end of which time he was brought in, but as the fragment was not yet fully united he was ordered to continue its use for another week, when it was deemed safe for the appliance to be removed.

On seeing the patient several weeks later, the parts had fully recovered, new gum had formed over the points of bone exposed by loss of external covering, and only a slight cicatrix and external depression remained as a remembrancer of the calamity.

It may be mentioned that of the three general practitioners, who were first called to see the patient, two were persistent in their wishes to cut away the loosened fragments, which would have caused a permanent opening into the middle meatus of the nose, but at the instance of the third physician, the case was finally turned over to me for treatment.

TO REGULATE THE PRACTICE OF DENTISTRY.

EDITORS MO. DENTAL JOURNAL:

In the columns of No. 8, Vol. 2, of the *Dental Office and Laboratory*, appeared an article entitled, "Our Duty in Reference to our Patients." After perusing the article I was surprised to find that instead of most of it being devoted to the subject which one would infer from the title, nearly all of the article was in reference to the passage of laws to restrict the practice of dentistry, and in defence of the anti-law *wing* of the profession, or, in other words, the scores of undoubted quacks who are protected under this *wing*, greatly to the detriment of the reputation of the remainder of the party, who are worthy, yet erring in this most important question. It is earnestly hoped that these few may see their wrong before it is too late, and by way of redemption be as zealous in endeavoring to accomplish that which they are now endeavoring to subvert.

The necessity of some means to drain the dental profession of its gross element is severely felt. Then the remainder would be better remunerated for their services, and by this incited to a better qualification of themselves professionally, and lastly, but not least, be cleansed of the stigma of the association of such men.

To be incited to a better qualification of ourselves professionally by the means of better remuneration, may appear at first thought to be measuring by too low and practical a standard, and this indeed would be so if it was intended to influence a small community of dentists: but instead of the number being small, in the United States alone there are exceeding ten thousand dentists in actual practice. To influence such a vast number, appeals to our selfish natures must be made.

I would be far from excluding all from practice who are not graduates, yet let all be compelled to pass an impartial examination before those properly authorized.

Some few of the Eastern States have passed laws regulating the practice of dentistry; so far those States have experienced the good effects of it. It has retained those at home who passed

the ordeal, whilst the less fortunate have gone abroad where no such restrictions exist, to continue to perpetuate their malpractice. Shall the West stand still and be overrun by this flood of emigration till it is too late to remedy the evil? There is no section more in need of such measures.

One of the objections urged by the anti-law *wing*, is that some who are considered fitted may be prevented from honestly gaining their subsistence. No fears need be entertained of this; wise legislators in framing laws show leniency on the side of liberty.

We are aware that the innocent are at times punished whilst the guilty go free; but where one is punished for a crime of which he is innocent, a score of guilty ones are declared "not guilty." It is not expected for a law to deal justice in *every* instance, but to benefit the majority.

Legions of well-meaning brethren are clamoring "educate the masses." This is popular; a high sounding term with nothing in it, like a drum in both sound and substance. Those who are in the habit of tickling their vanity by such an expression would do well to throw off this cloak of magnanimity, and show themselves in the garb of earnestness, and go to work in truth. If every one will add a drop, the bucket will be full in time.

R. H. Winsbrough.

Pleasant Hill, Mo.

FILLING TEETH.

By H. Judd, M.D.

(*Continued from page* 518.)

In order to achieve success in filling with pellets, the first requisite is to fix the first pieces in such manner that they cannot be easily displaced, and as this is the method much more generally adopted than any other, there is no danger of giving too much attention to this point. A foundation being firmly and securely laid, and the cavity securely protected from moisture, a satisfactory result may be attained under nearly all other adverse circumstances. The fixing of the foundation is in many cases

the only really difficult part of the operation. In some cavities this is pretty easily accomplished, and old operators who have become accustomed to any of the most approved methods of doing it, soon forget the difficulties that met them at first. Many operators commence with a cylinder of considerable size, annealed and placed in such part of the cavity as the shape, size and location of the cavity demands. After driving it well home with a mallet, in many cases it will be necessary to hold it with an instrument in the left hand, or, what is generally less reliable but much more convenient, it may be held by an assistant until a sufficient amount of gold has been introduced and consolidated to render it no longer necessary to be held. In approximal cavities this cylinder is usually placed horizontally upon the cervical wall of the cavity, extending from that part of the cavity nearest the pulp chamber out over the margin of the cavity. Two or three other cylinders are sometimes laid upon either side of the first, and after all have been well driven down, pellets are then added and the rest of the filling built up of them. This in many cases is pretty easily accomplished, and an excellent cervical margin is obtained by this method, which is the one great desideratum in approximal fillings, and which too many, by far, fail to obtain. Some drill small retaining points deeply into the dentine around the pulp cavity, and first fill several of these with small pellets, and then attach a larger piece to the gold in the retaining points, and thus lay a firm foundation. But the drilling of these points in sensitive teeth is frequently sufficiently difficult, and in some cases, where the hyperæsthesia is marked, altogether impossible. Some place as large a pellet of adhesive gold in the cavity as can well be forced into it, and then drive it well down for a foundation. But in many cases, when the bottom of the cavity is smooth, and especially when the side walls are also smooth, when gold is attached to one side or the other of this foundation it will move, and no manipulative skill of the operator will then be able to fix it, and it would be best in such cases to remove it and commence again.

Some use non-adhesive or soft gold for this purpose, proceeding in the same manner as has been just described. But this, al-

though obviating to a certain extent some of the difficulties, is somewhat objectionable, inasmuch as, as firm a union is not obtained between the foundation and the rest of the plug as is in some cases desirable.

No method of laying the foundation can compare favorably with one proposed in Taft's Operative Dentistry,—that is by the use of crystal gold. Morgan's plastic gold answers the purpose well, and the ease with which a foundation can be laid with it that will not rock when pellets are added to it, makes it a very valuable agent in the hands of any competent operator. If the cavity be an approximal one, the best margin will be generally obtained by placing a piece of this gold upon the cervical wall and driving it down well with a rather broad point, convex in shape, and slightly serrated. The gold should not extend quite to the margin of the cavity. Upon this, place a pellet of adhesive foil, letting it extend over the crystal gold, and also slightly over the margin of the cavity, so that the margin is made of foil rather than with the crystal gold. If heavy foil is used, place a single thickness of No. 60, or two or three thicknesses of No. 20, folded smoothly and cut into squares of an eighth or a fourth of an inch each, upon the crystal gold foundation, and let it extend out over the margin of the cavity as described above. Then add pellets of any numbers that you please from 2 to 60, and build up the plug as upon any other foundation.

The great advantage claimed for crystal gold foundations over all others, is that when a considerable surface of the walls of a cavity is lined with this gold, even if there be no sharp retaining points, it will not rock or slide whilst building on the rest of the filling, and if skillfully manipulated no sharp angles or drilled retaining points are required provided that the general shape of the cavity be such that the plug when introduced and consolidated will be retained. In cavities, where it is extremely difficult to fix a foundation, it is invaluable.

Whilst building up the filling in a cavity, the greatest care should be taken to make the margins perfect. Every part of the margin of the cavity must be seen, and if one trusts to his general good luck in places where it is difficult to see what he is

doing, but where he hopes it will be all right when he gets through, he may be sure that it will prove a failure. A great majority of operators are in too much of a hurry, to show creditable and really useful operations.

If large pieces be put in they will inevitably be full of pits and crevices when the operation is completed. Many do not half consolidate the gold. Take for instance a sheet of No. 4 gold, cut it into three equal parts, and roll into ropes loosely ; cut into pellets from one-fourth to one-third of an inch long, and it will require from forty to eighty smart blows with an ordinary mallet to properly consolidate each piece. Whilst building up a filling every part of the walls of a cavity should be built against with the same care that is taken with the margin which is to receive the final finish. The gold should be carried slightly above the margins of the cavity, so that when dressed down, the line of junction between the gold and the tooth substance may be as nearly perfect as possible. The surface of a filling may be pretty easily and rapidly polished if the consolidation is complete, and if there is a failure in this respect all the filing and stoning and polishing that is used will be of no avail.

If the edges are too high and extend beyond the margins, or if they are roughened, chisel them off, and if the plug will not bear to be chiseled without displacing the plug or detaching some of the gold from the mass in the cavity, the filling had better be out at once, and try again for a better result. If, after a plug is filed down, you pass a burnisher over the surface with considerable pressure, and the surface then presents a wavy appearance, you may be sure that it has not been properly consolidated.

No amount of driving can compensate for using too large pellets of the finer numbers of gold. It is true that most kinds of gold foil will refuse to unite readily and firmly if the surface is driven down too hard and smooth, but this difficulty is easily overcome by the use of Nos. 20, 30 or 60, so that for making a good surface these numbers are particularly valuable. The surface being filed and margins chiseled off even with the tooth substance, the filling may be finished with pumice stone and rotten stone.

The finish made by burnishing a surface is too often deceptive,

as it seems to smooth over and fill up the pits upon the surface, but a little use of the tooth reveals them again, so that a filling that appeared very respectable when the patient was dismissed, will present a very different appearance if examined a few days later.

In these hints in relation to filling teeth no attempt has been made to give a detailed account of filling in special cases, nor to describe exhaustively even the general principles of this exceedingly difficult and important operation; but a few points have been noticed that we hope will be of some service to young practitioners in guiding them to the attainment of satisfactory results.

Mechanical and Miscellaneous Department.

CHEAP DIPLOMAS.

FT. MADISON, IA., Dec. 10, 1869.

DR. CHASE:—Allow me through the JOURNAL to expose the latest, largest and lowest confidence operation extant. On the 14th of last November I received the following *printed* circular:

[*Copy.*]

COLLEGIATE AGENCY.

This agency has been established for the purpose of giving such information as is generally necessary before entering upon a collegiate course of study, or taking any of the learned Degrees.

Books, Medicines, &c., will also be sent C. O. D. at market rates, upon receipt of orders.

Physicians' Practices sold on accommodating terms.

Through the recommendation of this Agency, Physicians, Lawyers, Clergymen and Teachers can obtain the Honors of all the Universities in the United States, such as the Degrees of A.M., A.B., M.D., D.D. S., D.D., LL.D., &c.

For additional particulars, address, A. J. HALE, M.D.,
214 Jacoby Street, Philadelphia.

Smelling a large-sized rat, and deeming it a *duty* to *trap* and expose the same, I replied as follows:

FT. MADISON, IA., Nov. 15, 1869.

A. J. HALE, M.D, 214 Jacoby St., Phila.:

Dear Sir:—For what price can you obtain the Degree of D.D.S. for me? Have been practising for ten years.

For standing in my profession, etc., refer you to any member of the *Iowa State Dental Society.* Yours, Truly,

U. D. TAYLOR.

To which I received the following reply:

PHILADELPHIA, PA., Nov. 23, 1869.

DR. TAYLOR—*Dear Sir:*—Yours of 16th inst. at hand. In reply, you can obtain (through this Agency) the Degree of D.D.S., from first class institution of this city at a cost of $50, and *possibly* from some for less, say about $40.

The document will be sent you by express C. O. D. if desired.

The requirements will be one or two good names as references, and your own name in *full*, so that it can be printed on the Diploma.

Hoping to hear from you soon, I remain,

Very Respectfully, A. J. HALE, M.D.,
214 Jacoby St., Phila.

I thought so: "just as I supposed, and no more than I expected."

FT. MADISON, IA., Nov. 27, 1869.

A. J. HALE, M.D., 214 Jacoby St., Phila.:

Dear Sir:—If you will send me a diploma from the PHILADELPHIA DENTAL COLLEGE, via express, C. O. D., with "power to open and examine" before paying express charges, you may do so.

Yours, Truly, U. D. TAYLOR.

P. S.—Refer to Prof. Chase, Missouri Dental College; Prof. Hughes, Keokuk Medical College; Prof. Allen, Chicago Medical College. TAYLOR.

Yesterday I received the following. "Tickle me, Tommy, and I'll tickle you."

PHILADELPHIA, PA., Dec. 4, 1869.

DR. TAYLOR—*Dear Sir:*—Your diploma from Dental College has been forwarded to you by express, with instructions to agent to permit you to examine it before paying for it. Hope you will be pleased with it.

If you furnish me any more applicants, I will allow you $10 on all sales made them through your influence, or twenty (20) per cent on amount.

Very Respectfully,

A. J. Hale, M.D.

To-day the express agent brought up the formidable document; gorgeous in size; Latin; gilt seals, red ribbons, &c., &c. But alas!! from the AMERICAN UNIVERSITY OF PHILADELPHIA.

Behold the array of talent whose names are signed to this remarkable "Pub. Doc."!!

John Thomson, M.D., Prof. of Chemistry et Toxicology.

John Buchanan, M.D., Prof. of Surgery, &c.

Samuel Roberts, M.D., Prof. of Mat. Med.

J. C. Terry, M.D. Prof. of Physiology.

William Clark, M.D., Prof. of the Practice of Medicine, &c.

H. F. G. Hutchins, M.D., Prof. of Midwifery, &c.

James Cochran, M.D., Prof. of Anatomy et Physiology.

John P. Worrell, M.D., Prof. of Operative and Mechanical Dentistry.

Also—Chas. Swartzengrover, Sec'y.

Heavens, what a name! No wonder the document cost (or was priced at) $50. How could the Hon. Sec. sign *such* a name, much less fill all the blanks in fine German text, for less than that?

The "Diploma" was opened and examined, and is now in the express office awaiting the order of A. J. Hale, M.D., and when this is published I shall have performed my duty.

Yours, very truly,

H. D. Taylor, (*not D. D. S.*)

RUBBER VERSUS ADAMANTINE, OR FUSIBLE METAL BASE.

The cry, what shall I do? still comes to us, as some poor victim of the Rubber Company, who has been overlooked, is hunted up and the strong arm of the law is raised to annihilate him, if he refuses to pay tribute; and what can we use in the place of rubber? is quite as often heard. We have answered these

queries many times during the year, by letter and through the medium of the Journal, and yet the cry is repeated. To those asking our advice, we again say, If you are blessed with any amount of this world's goods, and have money to pay tribute with, pay the demand and quit the use of the accursed rubber. In reply to the query, what shall we use in the place of rubber? we say try aluminium for full upper sets, or sets of eight or ten teeth, and Weston's metal for partial or lower sets. We are induced to recommend Weston's metal in preference to that known as adamantine, (Moffit's Metal), or the Walker's Excelsior Base, because from the tests we have made of these bases, this seems to us to promise the best results These bases are all similar in character, being nearly the same color and specific gravity, and requiring about the same degree of heat to fuse them. They are alike affected by the mineral acids. Either of them will run sufficiently sharp to make a good fitting plate, and are all manipulated in the same manner. From our own personal experience, and the experience of others in this city, who have been testing these bases for the past six or eight months, we are prepared to report as follows:

Compared with rubber, either of the above named bases are superior in point of strength and durability. The Weston metal has thus far proved as tasteless as rubber. The adamantine is not tasteless; some patients complaining of a disagreeable brassy taste after wearing a plate of it but for a few hours. Patients who have tried rubber, and been obliged to give it up on account of its effect upon the mucous membranes, causing inflammation and even sloughing of the soft parts, are now wearing plates of Weston's metal with perfect satisfaction. So far as we have been able to judge, Weston's metal is not affected by the secretions found in the oral cavity as much as rubber. It does not, materially, change color; it is much heavier than rubber. Its weight is undoubtedly a serious objection in many cases, while in others it may be regarded as an advantage. It may, with care, be cast almost as thin as an ordinary gold plate. Its strength not being equal to gold, it would require to be much thicker than the gold plate to get the requisite strength. It re-

quires a little more time to get up a plate on this, or either of the other bases, than it does on rubber. Time enough should be taken to dry *thoroughly* the mould before casting the metal; a little more care is necessary to secure satisfactory results; the labor is about equal when the operator is alike familiar with the manipulation of these bases and rubber. If proper care be observed in preparing the model plate to have it the requisite thickness, no thicker than the metal plate is required to be, and no surplus wax about the teeth, very little burring or scraping will be required in finishing.

The points to be observed in the construction of the fusible metal bases, are, 1st, To properly prepare the model plate, as is above directed, using *clean* beeswax for waxing of the teeth. 2d. If an air chamber is desired, cut it from the impression before making the plaster model; if lead or tin be used, as is done with rubber, it may be fused in heating the mould, or it may be so firmly united to the plate as not to be easily removed. 3d. The mould should be thoroughly cleaned of all particles of dirt or plaster, and most thoroughly dried. 4th. The heat of the mould, when the plate is cast, should be a few degrees above the melting point of the metal, *but not over heated.* 5th. The flask should be firmly held together, by placing it in a vise or clamp: the clamp accompanying the Moffit flask not being sufficient always. 6th. On removing the case from the flask, cast plaster on the palatine surface before attempting to finish. If these precautions be observed with care, the result will be satisfactory.

We do not wish to be understood to affirm that all Dr. Weston claims for his metal is true, nor as recommending its use without proper caution; we simply give the result of observations, which time may change. We hope others will test these bases, and send us a report. E.

ST. LOUIS MICROSCOPICAL SOCIETY.

July 28, 1869.—Society met at 8 o'clock P. M. Vice President Dean in the Chair. Minutes of last meeting read and approved.

Drs. Geo. E. McCosh and E. deCourcillon were elected members. Dr. Rumbold exhibited specimens and drawings of the secretions of the caruncule lachrymales, in which were shown fragments of woody fiber and bits of wood, hair, &c., which seemed to be in process of disintegration. Dr. Rumbold remarked that he had been making microscopic observations upon these secretions since 1867, and in several hundred specimens which he had examined these same appearances were almost invariably found. He was not prepared to say that this secretion acted as a direct solvent upon these substances, but he was rather inclined to think that this was the case.

Dr. Dean thought the solvent action of this secretion not yet proved. Said there were many objections to the theory, and he described the various secretions of the eye, gave their general characteristics and chemical composition, and said that he found nothing in them to justify such a conclusion.

Dr. Judd said he had examined a good many specimens, and he was disposed to think there was some foundation for the doctrine.

The constantly recurring appearance of these disintegrating lanugines and other small objects that so frequently find their way into the secretions of the eye could hardly be accounted for upon any other supposition. If the object was sufficiently large to cause irritation and inflammation, it is probable that the secretion of these glands would be arrested in like manner as the function of other parts is usually arrested by inflammatory action, so that it is only in respect to very small particles that the action of the secretion can be observed.

Dr. Gill said he thought the subject needed further investigation.

Dr. deCourcillon had examined some specimens, and from what he had seen he was not disposed to adopt the theory that the secretions of the eye dissolved small particles. He said all our experience went against it.

Dr. Hammond exhibited a specimen of cartilage from the ear of a mouse.

After some further discussion society adjourned.

St. Louis, August 25, 1869.—Society met at 8 o'clock P. M. President in the Chair. Minutes read and approved.

Dr. Wm. H. Eames presented to the society a microscope which had been donated by James H. Logan, a mute, a graduate of Columbia College, who is a manufacturer of microscopes. It was accepted and a vote of thanks tendered to the donor.

Dr. H. Z. Gill presented a specimen of a tumor removed from the posterior aspect of the leg of a boy eleven years old. It was nearly round in outline, one and a half inches in diameter and neary one inch thick. The integumentary surface was dark-greenish blue, looking like a contusion of five or six days standing. It was of three or four months standing, rather dense, regular in outline, uniform in density, not painful except by considerable pressure. The glands in the corresponding groin were rather large, or at least rather prominent to the touch. Dr. Gregory removed the tumor completely by means of the knife. The microscope revealed ordinary fat cells, and a multitude of small cells in the connective tissue, having about the size of white blood corpuscles. *It was the round celled sarcoma.*

The wound cicatrized perfectly. A month after the operation the boy presented himself with a reappearance of the disease (at least to all external appearance) in the mouth. No appearance of the disease on the extremities.

Dr. Gill's specimen was colored with carmine, according to the direction of Beale, and was very beautiful.

After some discussion, and the transaction of business, the society adjourned.

St. Louis, September 22, 1869.—Society met. Minutes were read and approved.

The following were elected members of the society: Drs. O. F. Potter, H. H. Mudd, J. J. McDowell, Chas. Spinzig.

On motion, the Corresponding Secretary was instructed to subscribe for the Journal of Microscopical Science.

Dr. Judd reported a case, and exhibited a microscopical specimen of an interesting case of disease of the lower jaw. A year before a small ulcer presented itself upon the gum external to the second left molar tooth. The disease extended, and the tooth,

becoming loose, was extracted; the first and third molars were extracted at intervals of three or four months, and the bicuspids are now loose and their fangs denuded. The disease has now extended to the soft palate and down the throat to the vocal chords, as revealed by the laryngoscope. The teeth were all sound, and although a part of the alveolar process seems to have been absorbed, or at least to have disappeared, it is entirely covered by soft tissues which seem to be entirely covered with healthy granulations. Thinks it a species of epithelioma, and if it had been diagnosed sufficiently early it probably might have been successfully extirpated by the knife. He first saw the case about two weeks before.

Specimens of the secretions of the caruncule lachrymalis were also exhibited, and after considerable discussion the society adjourned.

(To be Continued.)

HEAVY FOILS.

Report of a Discussion on Heavy Foils, at a Meeting of the Saint Louis Dental Society, Held on the Second Tuesday of November, at the Office of Dr. PORRE, and Reported by him.

Dr. Eames—Said that he was only prepared to report in reference to No. 20 of the heavy foils, as he had not yet used any of the other numbers. Expressed himself highly gratified with results. Had experimented with alternate layers of No. 20 and the lighter Nos., and proved conclusively that it was softer, more adhesive, the weld more perfect, that it made a better finish and was manipulated with greater ease and facility than any of the lighter foils.

Dr. Forbes—Said the important object was to produce perfect fillings, and that in his opinion, if the gold, whatever the No., was driven well to the walls and margins, it was not so materially important to have the centre of the filling so hard. He had not used the heavy foils; could not understand why a ribbon could not be made of any required thickness or weight, by folding a sheet, or laying together a number of sheets of the lighter foils,

and cutting off strips to suit, that would answer a better purpose than the heavy Nos. spoken of,—that would be more easily and perfectly adapted to walls of the cavities, and altogether make as solid a filling. He did not doubt but that the heavy foils might be an improvement in building up, but could not agree, though in the absence of experience, that they can be used in filling a deep cavity or under cut cavity, as well as the less Nos.

Dr. Judd—Said that he was using Nos. 20 to 60: that he had really encountered less difficulty than he anticipated; consequently was prepared to give his testimony in behalf of heavy foils. He stated that he had used the different Nos. with a great deal of care and patience, noting every peculiarity that each one presented under manipulation, that his conclusions might be satisfactory. A test of No. 20, under experiment, had proven that a conformity to the walls of the cavity was perfect, also that the weld and solidity of the filling far exceeded any of the less Nos. He observed that he did not use any one No. exclusively in filling a cavity, that in some cases he used several different Nos. Expressed a decided partiality for No. 60 for the margins of cavities, and for finishing. Used No. 60 for contour fillings; thought he could make a better filling than with a less No. If an approximal cavity, he used Morgan's gold for a foundation or anchorage, and then with narrow strips ¼ inch or more in length, proceeded to fill; if a point on either border was broken away, he had no difficulty in building out to required fullness. If a crown was to be restored, he first made a level foundation and then with pieces of foil, size of surface, proceeded to weld layer upon layer; upon finishing, he stated that he had no fear of displacing the filling. Could chisel and file with impunity. His argument was that No. 60 required less force to make a perfect weld, than the same thickness made of folds of any of the less Nos., for reason that, in proportion as the foil was reduced in thickness, it was increased in density, therefore more difficult to weld. He stated, as a fact, that he could use upon No. 60 smaller points, without slipping, than upon any of the less Nos.

Dr. Chase—Had only used No. 20 of the heavy foils; had tried it in a cavity of an incisor of very delicate walls, with satis-

factory results; made a good filling; he attested to its superiority in such cavities over the smaller Nos., for reason that it really took less force to weld, and that it could be conveyed to place with less difficulty, and, too, without injury to the foil, which is sometimes the case with the smaller Nos. in whatever form they might be used. He cuts in strips ⅛ inch wide and ½ inch long, making foundation or anchorage with ammoniated foil, then welds one end of strips, and folds over and over, welding each layer as he proceeds; when a broken wall was to be restored to contour, he was convinced heavy foil subserved the purpose best, was more tractable under manipulation, made a more solid and better welded filling.

Dr. J. B. Morrison—Had filled but two cavities with No. 20; used strips ⅛ inch wide and ¼ inch long; succeeded in making very fair fillings, but was not satisfied with the heavy foil, with his small experience. Took issue with Dr. Judd upon the statement that it took greater force to weld an equal thickness of the smaller Nos. of foil.

Dr. Prince—Had not used the heavy foils.

Dr. A. W. Morrison—Had not tried the heavy foils, but was ready to adopt them in practice if proved superior to present Nos.

Dr. W. N. Morrison—Had a very limited experience in the manipulation of the heavy foils; was, therefore, not prepared to give an opinion; was disposed to believe that they would not supersede the smaller Nos. in filling deep cavities, &c.

GARRETSON'S WORK ON ORAL SURGERY.

We would call attention to the first article of the present No., which is a part of a chapter extracted from Prof. Garretson's new work, as it furnishes a very fair specimen of several chapters devoted to practical surgery, and which we hope will be closely studied by all who are ambitious of fitting themselves for treating all the diseases of the mouth and "associate parts." This chapter illustrates very well the want of a definite nomenclature, which is doubtless attributable to a want of definite knowledge

in regard to the manifold diseases of the mouth, which fact at once suggests to the mind the vast amount of labor that has yet to be performed in the way of investigation and experiment before a definite knowledge of pathology will be able to fully correct our nomenclature and to direct our practice. We turn from the observation of phenomena and unaided ocular vision to the microscope for assistance in these investigations, and although microscopic observations have not yet solved all the mysteries that hang over this subject, its power has not yet been expended, and the future is full of encouragement to those who devote themselves to this method of investigation.

We think this chapter will assist in bringing about something definite from the confusion that has heretofore reigned among authors in regard to this term, and one will obtain clearer views in regard to osteo-sarcomatous tumors from studying this chapter than can be obtained from many more voluminous works.

We do not endorse all of the histological, physiological or histogenetic doctrines hinted at in this work, but it seems that the author has given his chief attention to its practical features, and in this respect the work is full of interest, and should at once be in the hands of every dental practitioner. J.

MERRIMACK VALLEY DENTAL ASSCCIATION.

The annual meeting of the Merrimack Valley Dental Association was held at Lawrence on Thursday and Friday.

There was a large attendance of members, embracing the prominent dentists from Lawrence, Lowell, Salem, and from Concord, Portsmouth and Manchester, N. H., and other places. The following were elected officers for the ensuing year :

President—Dr. J. H. Kidder of Lawrence.

Vice Presidents—Dr. L. D. Shepard of Boston and Dr. A. P. Stevens of Portsmouth.

Recording Secretary—Dr. A. M. Dudley of Peabody.

Corresponding Secretary—Dr. D. T. Porter of Lawrence.

Treasurer—Dr. Hiram Hill of Manchester.

Librarian—Dr. Chester Heath of Manchester.

Executive Committee—Dr. Thos. Palmer of Fitchburg; Dr. J. B. Prescott of Manchester; Dr. G. A. Young of Concord; Dr. D. W. Edgerly of Farmington, N. H.; Dr. W. P. Kelly of Franklin, N. H.

To the Members of the American Dental Association:

Section 5 of Article III, of the new constitution of the American Dental Association, adopted at its last session, is as follows:

"Permanent members shall consist of those who, having served one year as delegates, and complied with the requirements of the Association, shall signify to the Treasurer a desire for permanent membership."

I therefore request all members, who have not already done so, to signify at once to me their desire, whether they wish to be considered permanent members, or delegates, that I may adjust my books accordingly. WM. H. GODDARD, *Treas.*

Cor. 4th and Green Sts., Louisville, Ky.

THE FIRST VOLUME
OF THE MISSOURI DENTAL JOURNAL.

This number completes the first volume of the MISSOURI DENTAL JOURNAL, and the success of the enterprise thus far has proved exceedingly gratifying to those who have labored from the time of its inception to make it worthy of public favor.

The increase of its circulation has exceeded our expectations, and we are not unmindful of the fact that this has been mainly brought about by the energy and interest manifested by our friends in our behalf, and in behalf of the enterprise in which we are engaged.

We would acknowledge our obligations to our friends in Chicago, Brooklyn, and San Francisco, as well as many others, from Boston to New Orleans, and especially in Ohio, Indiana and Iowa, who have interested themselves in extending our circulation.

We must attribute also a part of the interest manifested in our enterprise to the fact that the Journal is freed from all "entangling alliances," with publishers whose special interests are sometimes supposed to be jeopardized by speaking the truth too plainly, or of large advertising patrons, whose special interest must also be consulted or whose patronage would be withdrawn.

We have been cautious thus far in recommending new modes of practice until they have been thoroughly tried, and no advertisements will appear in our columns which will have a tendency to induce our readers to purchase the thousand and one useless humbugs that are offered for sale and so freely lauded throughout the land.

Our advertisers will have their advertisements placed fairly before the profession, and our rapidly increasing circulation makes the Mo. Journal a very desirable medium for that purpose.

The price of the Journal for the next year will be $3.00, the same as for the current volume.

We do not intend to compete with any other in price, as we believe the profession are willing to pay a fair price for a Journal, especially as the Editors of this Journal pledge themselves to expend every dollar received for it in making it more useful to the profession, and more especially as the Editors themselves receive no pecuniary compensation for their labors.

With the experience of the past to guide us, we shall labor in the future with the same zeal as we have in the past year to make the MISSOURI DENTAL JOURNAL worthy of the patronage of the profession.

J.

MORTUARY STATISTICS

Of Five Large Cities, for the Month of November, 1869.

Boston, ...	population	240,000.	deaths	403
St. Louis, ...	"	240,000,	"	493
Chicago, ...	"	252,000,	"	487
New Orleans. . .	"	200,000,	"	473
Cincinnati, . . .	"	230,000,	"	273

C.

This book must be returned to
the Dental Library by the last
date stamped below. It may
be renewed if there is no
reservation for it.

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